



Volume 4 Number 7

\$2.95

April 2, 1985

Tax Strategies

*The Price Waterhouse Approach
To Choosing Tax Software
For Your IBM*

**Two from Tandy:
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1200 HD Compatible**



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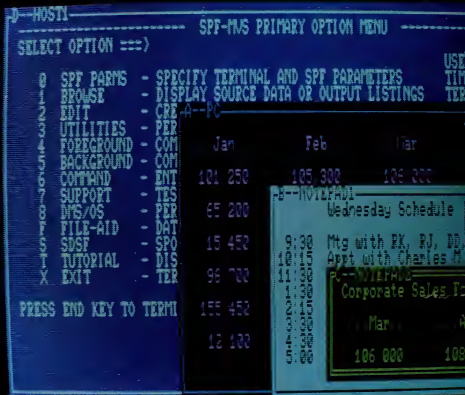


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C9

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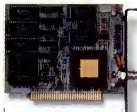
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PC: The Independent Guide to IBM Personal Computers ISBN 0-9405-200-0 published by weekly for \$24.97 for the one year (26 issues), \$49.97 for two years, and \$84.97 for three years. Additional postage \$4.00 for Canada and all other foreign countries. PC Communications Corp. a subsidiary of Ziff Davis Publishing Co., One Park Ave., New York, NY 10016. Second Class postage paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Address changes in PC: The Independent Guide to IBM Personal Computers, P.O. Box 1240, Boulder, CO 80502. Editorial and Business Office: One Park Ave., New York, NY 10016. Editorial (212) 903-5221. Advertising (212) 903-5100. For subscription inquiries and orders, write to PC Magazine, P.O. Box 2443, Boulder, CO 80502. PC is an independent publication not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Enter company Copyright © 1981 PC Communications Corp. All rights reserved. reproduction in whole or in part without permission is prohibited. The Index and the Source Code are trademarks of PC Communications Corp. PC: The Independent Guide to IBM Personal Computers, PC Mail, PC Lab, PC Communications, Project PC, PC Tack, PC Booklet, User to User, PC News, Permissions: Material in this publication may not be reproduced in any form without permission. Inquiries for permission should be directed to Ann Lennardson, Ziff Davis Publishing Company, One Park Ave., New York, NY 10016. Editorial Communications may be addressed to SOURCE: IBMMS, Copyright 1981, 713 or 863, Mail 07-0001, PC Interactive Reader System, (212) 903-5100.



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Cover Photograph: Dennis Kitchen

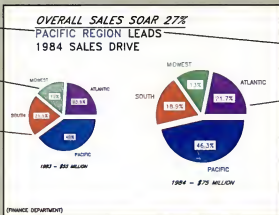
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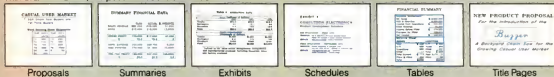
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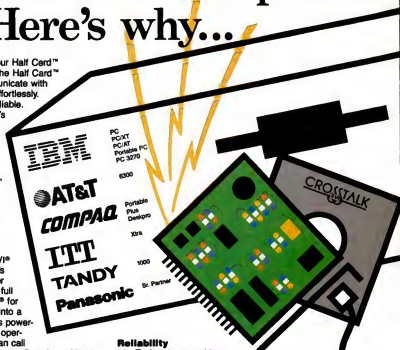
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What's Inside

Income tax time is approaching, and you know that you've got to get organized. But there's no need for panic—the right software program can do a lot of the work for you.

It's something that doesn't really sink into your consciousness immediately. There's the morning you wake up with a strange sort of ache in the back of your head, thinking, "What was it that I was going to do?" There are the H&R Block commercials that start interrupting the Late Late Show. Finally, there are all those little pink message slips on your desk from your accountant that you somehow never found time for.

Yep. It's income tax time, ladies and gentlemen. That one deadline that causes even the mightiest among us to groan and the most poetic to forget the joys of spring amidst the travails of paperwork.

Of course, you all know what I'm leading up to here. After all, this is *PC Magazine*, and we wouldn't be subjecting you to this ugly reminder without offering a possible (computerized) solution to see you through.

Tax Software

Actually, it shouldn't be at all surprising that there are over a dozen packages out in the marketplace to help poor, besieged PC owners with their taxes. After all, isn't that what home computers are for? Keep track of recipes, balance the checkbook, and figure out your taxes?

Of course, when the software manufacturers finally put their minds to it, they found that making up a tax program



wasn't as cut-and-dried as all that. The variations on the United States tax form and on the manner in which it is completed are enough to make any self-respecting PC owner seriously consider going on strike. Then, of course, each year brings various changes: the "simplified" forms, the new deductibles and nondeductibles, the reinterpreted meanings of such terms as "business use". . . .

Well, *PC Magazine* has collaborated with Price Waterhouse in trying to establish what the latest crop of tax software packages purport to do for the hapless citizen and exactly what they really can do. Unfortunately, the variety of these

programs is almost as wide as the variety of tax forms—some organize information and simplify recordkeeping, for example, while others attempt sophisticated tax preparation.

To look at these 14 programs, associate editor Jennifer de Jong organized our usual, talented (if we do say so ourselves) set of reviewers: Winn Rosch, Bil. Alvermaz, Jared Taylor, Laura Lou Meadows, David Thraikill, Brian King, and Sheldon Kahn. (It should be noted that Jennifer took on the task of organizing this project with an enthusiasm above and beyond the call of duty—and that as soon as it was over, she sped off to Jamaica faster than a PC AT.)

A Computer on Every Lap?

Meanwhile, associate editor Stephanie Stallings undertook to review the DATA GENERAL One lap computer. A very talented editor, Stephanie can be rather naive in certain technical respects. For example, she assumed that a lap computer was a computer that could fit easily onto one's lap. However, it soon became clear that when such peripherals as the extra 5¼-inch disk drive and the printer were added, the DG/1 spread out to take up most of her desk.

Once she had the computer completely assembled, Stephanie sat down to take a look at the new DG/1. A very long look.

WHAT'S INSIDE

Very close up. Under very careful lighting conditions.

You see, while the DG/1 has many things to recommend it, one of the prob-

lems that became immediately apparent was that the screen wasn't terribly clear—especially before the company sent us the new nonglare screen. Staff

members who were interested in the new machine and who wanted to watch Stallings run it through its paces would soon find themselves marching around with semipermanent squints.

In fact, the testing of the DG/1 was also the occasion of a somewhat historical event: the first time executive editor Mike Edelhart was caught without anything to say. Stephanie was checking out the machine's modem in the presence of one or two curious onlookers when Mike wandered in and peered over her shoulder. After watching her type for a few minutes, he asked bemusedly, "Why don't you turn the computer on?"

Stephanie paused, looked up at him straightfaced, and said quite truthfully, "It is on."

Mike looked at Stephanie, stared at the screen for a few long minutes, then grinned and walked out. That said it all.

Meanwhile, associate editor Barbara Krasnoff was very happily working on a review of the Tandy 200, that company's successor to its Model 100 lap computer. Why happily? Well, PC wanted to get the story into its pages as soon as possible, and Tandy just didn't have its review machines ready to ship. So Barbara was able to put a trip to Fort Worth, Texas, on her expense account. (The trip didn't turn out to be quite as much fun as she had expected, however—she landed in the Dallas/Fort Worth airport to find the region paralyzed in the grip of its worst snowstorm in years.)

Freelance writer Winn Rosch was spending his time investigating Tandy's new 1200 HD PC-compatible. PC regular Dick Aarons has contributed a special report on beating the DOS-CP/M compatibility blues, and Bobbie Dubroff tried to discover the hidden talents of psychology software.

Of course, very soon we will not be able to call on the services of any of our writers—at least, for a week or so. You see, even writers have accountants, and tax programs, and April is coming up very quickly. . . .

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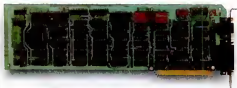
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(*) Benchmark run on an IBM PC using MS Pascal version 3.2 and the DOS Inter version 2.5. The 179 line program used is the "Sieve of Gold" program out of Alan R. Miller's book. Pascal programs for scientists and engineers (Sybex, page 128) with a 3 dimensional non-singular matrix and a relaxation coefficient of 1.0.

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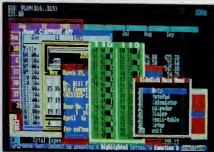
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Last Name & First: PAUL G. MARY J. Filing Status: Single

Social Security Number: 222-22-2222 Date of Birth: 01/01/50

Street Address: 123 SOUTH LOTSUS AVENUE City, State, Zip: 00000, AA 00000

Other Dependents: 0

Enter income, credits, and deductions

AGI: 10,000

Adjusted Gross Income: 10,000

Standard Deduction: 1,000

Exemptions: 2

Other Deductions: 0

Net Taxable Income: 9,000

Income Tax: 1,800

Refundable Credits: 0

Non-refundable Credits: 0

Other Credits: 0

Net Tax: 1,800

Payments: 1,800

Refund: 0

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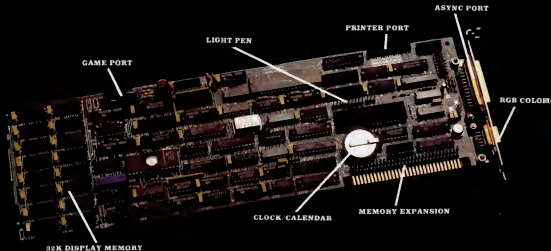
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PC World

IBM News

FROM THE EDITORS OF PC

April 2, 1985

IBM's Switch in Drives May Derail Programs

BY CHARLES BERMANT AND DON KENNEDY

BOCA RATON, Fla.—The IBM PC you buy today may not run the IBM PC programs you used yesterday.

Incompatibility has taken on new meaning with the release of the latest IBM PCs. Some software that formerly ran on the PC will no longer operate properly because IBM is now using less capable floppy disk drives.

The problem with the newer drives is their inability to read track 40 of the floppy disks. Several programs now on the market use track 40 in their copy protection schemes, so disk drives that can't read the track won't run the program. In other words, even programs written specifically for the IBM PC may not now run on the IBM PC.

Track Switch

It's not our fault. That, in essence, is IBM's response to the problem. Jim Slade, a spokesperson for the Entry Systems Division, stressed that the specifications for the PC's disk drives never promised the ability to read track 40.

"We always said to write your data on tracks zero to 39. If someone goes beyond that, they're going beyond what we said was compatible," he said.

The problem, of course, is that until the recent models of

the PC were sold, the disk drives exceeded specifications. They could read track 40, and some software developers opted to use the extra track under the assumption that IBM would continue to exceed its PC specs. Now some are complaining bitterly that IBM has pulled its big blue rug out from under them.

McGraw-Hill is one publisher that used track 40 for its copy protection scheme. A company official who asked not to be identified says that the company has begun to receive complaints from users who had no problems with the company's software up till now. The official complained that IBM did not notify anyone of the performance changes of its latest PCs, nor was IBM cooperative in helping McGraw-Hill diagnose and problems with its programs.

Design Differences

Slade acknowledged that IBM has in fact changed its disk drives and that the newer drives do not read track 40. "The design has changed," he said, "and the drive now has a mechanical stop." Experts in the field say that the drives used previously employed an electronic signal to signify that the head had read the last track. The new drives have what one ana-

lyst described as a "post" that physically prevents the head from reading any further than track 39.

Slade also implied that any blame in this matter rests squarely on the shoulders of software developers who wrote programs that exceeded the PC's written specifications.

"We've had many seminars with third-party developers," he said, "particularly addressing copy protection and writing on only the first 39 tracks."

Industry leaders knowledgeable about copy protection said that several programs currently on the market will be affected by this change. However, the secrecy surrounding such schemes meant a listing of affected programs was not readily available.

IBM, would not confirm when the newer disk drives first appeared. They entered the market "over a period of time," Slade said. "I can't give you a clear-cut answer."

Lotus Won't Go Into the Service

BY VIRGINIA DUDEK

NEW YORK—The forces of copy protection have done battle with the U.S. Armed Forces, and the copy protectors seem to have won. After a recent meeting between the Lotus Development Corporation and purchasing representatives from the Air Force, the armed forces now have to decide whether or not to sidestep a federal regulation re-

quiring that all military installations use non-copy protected software. It is the only way they can buy I-2-3, because Lotus won't remove its copy protection, even for Uncle Sam.

"We offered to give them extra backup copies," says Steve Crumney, director of sales at Lotus, who negotiated with the

(continued on page 35)

3.5 Inch Drives Rise in East

PC JX has U.S. observers speculating.

BY VIRGINIA DUDEK

NEW YORK—East is East and West is West, and soon enough the twain shall meet. At least if IBM has a hand in it.

Late last year, IBM Japan Ltd. began shipments to the Japanese market of the IBM Personal Computer JX, a machine with a 16-bit microprocessor, built-in 128K ROM, and, most significantly, 3½-inch floppy disk drives. Now there is heated speculation on just what effect this Japanese product will have on the United States market.

"This is the first sign from IBM of a definite move in the direction of 3½-inch drives," says Tim Bajarin, vice president of microcomputer research at Creative Strategies in San Jose, Calif. "The fact that it chose the 3½-inch drive predicts a long-term conversion by 1988."

Many observers believe IBM won't bring the 3½-inch drives to its American machines any time soon because it doesn't want to undermine the market for PCs and XT's, which carry 5¼-inch drives, and feels it would be wiser to wait for the development of a software base designed for 3½-inch drives. But Bajarin thinks that wave may already be approaching.

"The recent ACT (a British manufacturer of personal computers) announcement of an Apricot computer for the American market was also significant, because ACT got Microsoft and Ashton-Tate to write software for the 3½-inch environment. This will ensure these vendors a head start in the market." Bajarin thinks full acceptance of the 3½-inch drives is still 2 to 3 years away.

Lacking a Link

On the other hand, "there is no direct correlation" between the Japanese JX introduction and

IBM's American strategy, according to Doug Cayne, vice president and securities analyst at The Gartner Group of Stamford, Conn. "But we know IBM plans to show the 3½-inch drive in the United States this year. A low-cost version of the PC AT will probably be out in midyear."

Cayne does not think the 3½-



IBM's Japanese Personal Computer JX

inch drive will show up in an IBM lap-top computer until IBM has a successful desktop model with the new drives, because there would not be an ade-

quate software base. But Norm DeWitt, associate director at Dataquest in Cupertino, Calif., feels just the opposite.

(continued on page 35)

MicroPro Revamps WordStar 2000

SAN FRANCISCO—MicroPro International held a press conference on February 8 aimed at clearing up the problems and misconceptions surrounding its beleaguered new product, *WordStar 2000*.

Consumers have roundly rejected the program's original copy protection scheme, and MicroPro has responded by removing the copy protection and greatly streamlining the installation procedure. There is a strong sense of déjà vu about the whole affair, since it closely parallels MicroPro's attempt to copy protect the original CP/M version of *WordStar*, then provided on 8-inch disks. The hue and cry from users and dealers forced MicroPro to drop that scheme as well. The protected version was available for only a few weeks before it was removed from store shelves.

While the procedure for updating *WordStar 2000* was not available at press time, company spokesperson Judy Maclean characterized it as "even easier than a trade-in."

Redefinition

MicroPro is also taking pains to reposition *WordStar 2000* in the

marketplace. Many consumers and retailers perceive *WordStar 2000* as a replacement for, or upgrade of, *WordStar 3.3*, so company officials are reminding potential customers that *WordStar 2000* is a completely new product, that it does not replace *WordStar*, and that it is aimed at a completely different audience. *WordStar 2000* is targeted at cradle-to-grave word processing users who might be buying *MultiMate* now. The new program's highly mnemonic command set is easier for new users to learn. It's also easier for

casual users to relearn.

Meanwhile, *WordStar 3.3* is scheduled for new releases and updates. MicroPro recognizes that *WordStar*'s large and loyal following has a great deal of impact on the marketplace, and the company plans to do everything it can to maintain that group's goodwill.

A random, unscientific check of computer stores across the nation, however, indicated that sales of *WordStar 2000* have been spotty at best, with some dealers saying they were practically nonexistent. However, a recent best-seller list had *WordStar 2000* ranked 13th in sales of business software, just one notch below *WordStar*.

—By Bill Machrone

Multi-user dBase Sales Discontinued

CULVER CITY, Calif.—Ashton-Tate has discontinued selling its *Multi-user dBase II* in the United States and Canada. This product was a networked version of the widely-used database management program and included such features as collision protection. "Everyone concerned would prefer to wait until a networked version of

dBASE III is available," said Ron Arons, Ashton-Tate's product manager for the multi-user product. The company declined to announce a release date for a networked *dBASE III* and would not reveal how many copies of the discontinued program had been sold.

Ashton-Tate will still support (continued on page 35)

Lotus (continued)

Air Force procurement officers. "And they seemed amenable to that. Their legal counsel needs to decide if backup disks are sufficient. It's their decision now, not ours."

Crummey notes that other divisions of the armed forces have agreed to use backup disks of Lotus software in lieu of unprotected copies, but the Air Force is still undecided.

The issue arose when the Air Force Computer Acquisition Center at Hanscom Air Force Base near Lexington, Mass. was working with Zenith Data Systems of Glenview, Ill., on a hardware and software contract. It reviewed a number of spreadsheet programs, and decided upon 1-2-3. The order would have amounted to over 7,000 copies of 1-2-3 purchased over a period of several years.

The hitch came when the Air Force stated it could use only unprotected software programs. Many military installations are in remote locations, and so Federal Acquisition Regulations (FARS) state that protected software cannot be used, since, should anything happen to the disks, it may be necessary to make additional copies of the program. Despite this rule and the willingness of other software vendors to provide the military with special unprotected copies, Lotus responded with a firm, "No."

"To have unprotected software is contrary to our philosophy," says Crumney. "If you don't protect your software, you won't have an industry."

The armed forces offered to impose the strictest disciplinary measure, a court martial, on anyone caught copying protected software programs, but Lotus held firm in favor of program integrity.

"It comes down to Lotus's definition of its product," says Jack Frank, director of applications software at Zenith. Lotus is part of a committee working on copy-protection standards that Frank says should be out in late 1985 or early 1986. "Lotus feels that now is not the time to make exceptions to the rules because it does not want to take temporary measures while



"The armed forces will court martial anyone copying protected software."

searching for an industry standard, and that's not the way it sells its product."

Frank notes that Zenith does sell non-copy-protected versions of 1-2-3 to the Air Force for use on non-IBM compatible machines. Zenith is the only firm that produces 1-2-3 in its own factory, by virtue of a special contract with Lotus. Lotus produces all OEM versions.

Replacing 1-2-3

In this particular contract with Zenith, the Air Force almost went with a decision to substitute Sorcim/IUS's *SuperCalc*. That software is not copy-protected, and users who want to make copies can purchase on-site licenses from Sorcim/IUS to duplicate the program. "As the package is upgraded, a company with a large investment in software can fix its costs," says John Walker, corporate account manager of micro software at Sorcim/IUS in Jericho, N.Y.

The Air Force conducted

side-by-side tests of the two products at the procurement center. Participants noted that both programs have advantages. However, with the recent Lotus negotiations, Crumney believes the Air Force is reconsidering which spreadsheet software will be used in the Zenith contract. The decision whether to use backup copies of 1-2-3 or unprotected copies of *SuperCalc* is still up in the air.

Another spokesperson related a rumor that illustrates why Lotus is fighting for copy-protection standards. Apparently, Lotus examined estimated revenues from 1-2-3 over a full year and concluded it was receiving just 40 percent of all revenues garnered from 1-2-3. "People are selling pirated copies of 1-2-3 in the shopping malls for \$300," says the spokesperson. "Lotus is not getting that money. It figures the potential losses are not enough to outweigh the benefits of protecting the software."

3.5 Inch Drives (continued)

"We think IBM is likely to bring out a true portable this year and will lean towards the 3½-inch drive. The true portable is the first step to getting popular software labels converted to the 3½-inch drive. Unless sufficient software exists, there's no sense in a PC with a 3½-inch drive."

Another event that fuels speculation on IBM's drive conversion was the recent termination of its order of 5¼-inch drives from Tandon Corporation in Chatsworth, Calif.

"Either IBM will start producing its own drives, or IBM is going with the 3½-inch format," says Maureen Fleming, senior analyst at International Resource Development in Norwalk, Conn. "I can't make up my mind which it is." Fleming speculates that IBM may want to "try to see how the 3½-inch works in Japan before bringing it over here."

But Bajarin says "there's no question it's a Sony disk drive" in the JX computer. He also noted a rumor that Toshiba is making bids to do a 3½-inch drive for IBM's lap-size computer.

Bajarin adds that IBM's market competition is "shocked and amazed" by the JX. "It's a flexible system, like the DeskPro 4 concept. You can build from no disk to two 3½-inch drives and a half-height megabyte drive." The JX ranges in price from \$674 for the JX-1 to \$1,516 for the JX-4.

dBase Sales (continued)

registered users of *Multi-user dBASE II* and says it will send users a free update of the software this spring. The company will continue selling its multi-user program in some international markets. "The product has enjoyed broader interest overseas," claimed Arons.

Multi-user dBASE II appeared in May 1984 (see "New dBASE II Is Network-Proof," PC, Volume 3 Number 7, page 39) in a version tailored for IBM PCs hooked into an EtherSeries network, which is made by 3Com Corporation of Mountain View, Calif. At that time, Ash-

ton-Tate announced that it was preparing versions that would run on other PC network systems and on other computers, such as Apple's Lisa 2. But Ashton-Tate had not delivered any more versions by the time the product was discontinued.

"If Ashton-Tate's getting rid of *Multi-user dBASE II*, it's really a shame," said Bob Buchanan, 3Com's software product manager. "It worked well for our needs. This past year we found it very effective running on our in-house network." Buchanan said the network in 3Com's plant linked over 150 workstations.

A few weeks after *Multi-user dBASE II* was released last spring, Ashton-Tate unveiled *dBASE III*, which takes far greater advantage of the IBM PC's capabilities than does its predecessor (*dBASE II* was originally developed for 8-bit computers). Soon after that, Ashton-Tate presented its multifunction *Framework* amid even greater hoopla. That season's one-two-three punch of Ashton-Tate software announcements appears to have inspired many network-bound customers to wait for the features of the latter programs.

—By James Langdell

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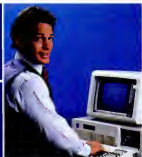
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The View at the Top

IBM's vice president of software development opens up and sheds some light on windowing.

BY JOHN DICKINSON

BOCA RATON, Fla.—"TopView's windowing is for future uses of the product, not current ones," according to IBM's Bob Markell, vice president of software development and publishing for IBM's Entry System Division. Markell clarified IBM's position about its new TopView enhancement for PC-DOS and new XENIX operation system for the PC AT in an exclusive interview with *PC Magazine*.

Most people, Markell says, have TopView's priorities backwards when they emphasize its windows, which can mix output screen from various products on one display. "TopView's real productivity comes from its ability to run multiple applications concurrently and instantly switch between them. It wouldn't make sense right now to install TopView just for its windows," he said, "because there aren't any applications out there yet that can use them."

To the oft-levied charge that IBM is trying to use TopView to close the door to the PC's open architecture, Markell responded, "Just look what we have done! We've had over 200 software developers down here [ESD headquarters in Boca Raton] for TopView training courses run by the TopView development team." He added that developers who took the course have access to TopView programmers through a telephone hot line so they can resolve any problems they encounter with the new operating environment.

Advanced Viewing

Markell went on to say that IBM deliberately announced TopView early and handed out prerelease copies to software developers so they could market products compatible with



Robert Markell

TopView's windows by the time it finally gets released. He said that IBM is looking forward to seeing compatible applications but expects that software companies will produce programs that can run with or without TopView in place.

"Besides," he continued, "one of TopView's original development objectives was to run all existing PC-DOS applications, and we almost made it." He added that work is continuing on those programs that don't yet work with TopView.

One thing that can keep a program from operating with TopView is the PC's memory limitation. When combined with TopView's 128K requirement, many programs won't fit into a PC by themselves let alone run concurrently with other applications. Markell is aware of the problem, and said, "The PC's 640K memory is clearly limited. We have to break through that barrier." He noted that the new XENIX oper-

ating system provides operating system provides one way to break through on an AT, but that as soon as another way is technically feasible on a PC, it would be done. "It's clearly an objective at IBM," he added.

Windows Storm

Asked why IBM had rejected Microsoft's as-yet-unreleased Windows product in favor of TopView, Markell countered, "First of all, we didn't necessarily reject Windows," explaining that IBM wanted to market a windowing product that did not require "massive changes" to existing software.

"Think of it as a compatibility objective that dictated a text-oriented windowing design," said Markell. "If you look at the number of text-oriented applications out there versus bit-mapped application, you'll see that a bit-mapped design clearly does not meet the universal applications objective."

With so many different products vying for the PC window market—programs like TopView, Windows, GEM, and Visi On—there has been talk of forming an American National Standards Institute (ANSI) committee to produce windowing standards. "I didn't know a committee was being talked about, but if one were formed, IBM would be interested," Markell commented adding, "Standards for the computer industry are an important thing."

It is possible that multi-

tasking and windowing products are a solution in search of a problem? Markell is optimistic about TopView. "People who have used TopView feel they are more productive with it than with straight PC-DOS."

Hula Hoops

Markell is realistic about the vagaries of success in the software market. "Let's face it, fads happen in this industry. Not too long ago the APL language was going to solve everyone's problem. Then it was MIS systems." He added that IBM has a strong commitment to TopView.

That comment brought up the question of XENIX's role as a PC operating system. "It's certainly not for everybody," said Markell. "But a significant community [of PC users] appear to find UNIX-based operating systems attractive. XENIX is an excellent product for those people."

"XENIX is not there as a growth path for PC-DOS users," he added. He said that PC-DOS will continue to be very significant and that IBM intends to provide a continuing series of PC-DOS enhancements. "If people abandon PC-DOS for XENIX in droves, we'll have to believe we're doing something wrong." On the other hand, he adds that, "IBM will look at XENIX applications very carefully to see what happens out there."

Markell expects two user communities to form, each with its own objectives and tastes. That's nothing new to someone with Markell's mainframe background. "You've always had the split between MVS and VM [IBM's two principal mainframe operating systems] fans," he noted.

Markell emphasized that IBM is keeping its ear to the ground in all areas. "User feedback is important to us because there's little you can do if a product is not useful to your customers," he added. Markell said that IBM is talking to dealers, user groups, trade shows, and the industry press to find out how customers are responding. "To TopView, to everything."

Speaking of Computers: The Big Frogs in this Small Pond

"The name 'Compaq' is bigger in the microcomputer industry than anybody but IBM and Apple—including AT&T."

—Rod Canion, President and CEO of Compaq Computer Corp.

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News In Brief



GE's new line of computer peripherals reaches out to the home user market.

GE Whiz . . . General Electric doesn't make just televisions and toasters anymore. Its **Consumer Electronics Group**, based in Syracuse, N.Y., now produces a line of computer peripherals—monitors, a modem, a printer, and a data cassette deck—designed to be compatible with a wide range of home computers. GE aimed at making general-purpose peripherals that wouldn't be obsolete when a user switched to another brand of computer.

Even though these products are primarily targeted at Atari, Commodore, and PCjr users, IBM PC users may find GE's monochrome monitor of particular interest. It puts very clear, 80-column, white-on-black text on its 12-inch screen—and turns into a television receiver at the flip of a switch. The monitor, model 12XR5204, has a suggested retail price of \$129.95. GE also offers a combination color monitor and television, model 13BC5509, for \$489.95; the color monitor, however, does not accept RGB input and is not intended for 80-column work. GE's new 300-baud modem also can be used with the IBM PC. It has an acoustic coupler cradle as well as modular jacks for direct connection. The unit can also be powered by batteries. The modem, model 3-8200, is priced at \$119.95.

GE's \$299.95 thermal-transfer printer, model 3-8100, prints both graphics and characters at a rate of 25 cps. Speed wasn't a priority for GE; instead, it aimed for quiet operation and dark, well-formed characters and graphics through a 16-dot pinhead and a carbon/wax ribbon (\$5.95 each). The printer uses plain paper, which can be continuous or single sheets up to 10 inches wide. The basic printer connects to an IBM PC's parallel interface; a printer interface sidecar for the PCjr, model 3-8160, costs an additional \$89.95.

Online, On-Air . . . CompuServe subscribers are going to have some input into what they hear on the radio, at least on "The Online Computer Connection," a 5-minute radio news show covering computers and related topics. The show, which is sponsored by CompuServe and produced and developed by Jameson Broadcast, Inc., should start airing nationally by the beginning of May.

Through The Online Computer Connection Forum, CompuServe's new on-line, interactive bulletin board, radio listeners can ask questions about a particular segment of the show or suggest topics for future shows.

Each broadcast will have four to six short segments of news and interviews—covering such topics as electronic mail, modems, user groups, hardware, software, and computer publications—and will feature discussions with industry experts.

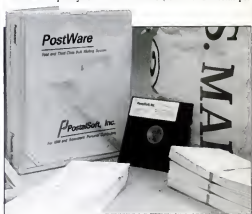
CompuServe also plans to set up a bulletin board called Broadcaster's Forum so that radio stations that carry "The Online Computer Connection" can communicate with one another.

Help for Lotus Blossoms . . . The New York 1-2-3 and Symphony User's Group is making available on-disk files of public domain software from The World of Lotus, Lotus's user bulletin board. The user's group is offering disks containing Symphony help files grouped by category and a database of macros for Symphony collected from a Lotus in-house contest. There are 20 disks in all for Symphony, with up to 10 files on each disk. A set of disks for 1-2-3 is expected soon.

The disks cost \$10 each, including postage and handling. For a copy of the group's newsletter containing a listing of the categories of available files, write to 1-2-3 Subscriptions, 2 Pierpont St., Brooklyn, NY 11201, (718) 596-0772. To order direct or make inquiries, write to Symphony Disks, 163 Joralemon St., Suite 1102, Brooklyn, NY 11201.

Playing Post Office . . . The recent rise in postal rates hit small businesses where it hurts, but a new PC software package can ease some of the pain. Taking advantage of the corresponding decrease in presorted bulk mail rates, PostalSoft's **PostWare** allows companies that do high-volume mailings to breeze through the U.S. Post Office's labyrinth of bulk mail regulations.

In order to qualify for the discount rate (as low as 3.4 cents per



piece for a non-profit organization) letters must have identical content and weight and be in specific zip code sequence. Working with a database, PostWare prints out mailings sorted to that order. PostWare can also assign the carrier route information required for bulk mailings to populous areas.

PostWare runs on PCs and compatibles and requires 192K of memory. For more information contact PostalSoft, 2115 Sunrise Dr., La Crosse, WI 54601.

—compiled by Jane Mintzer with Charles Bermant, Virginia Dudek, and James Langdell

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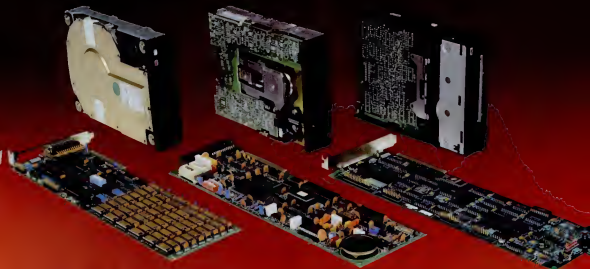
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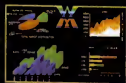
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PC-Communiqués

Whistle While You Network

Apple continued its 2-year-old Super Bowl tradition with the airing of another cryptic, never-to-be-seen-again commercial during the game's second half. This time, the ad showed a line of blindfolded businesspersons plunging off a cliff like lemmings while whistling the tune "Hi Ho, Hi Ho, It's Off to Work We Go."

But what does it all mean? I think the key to Apple's secrets can be found in that song. The original version was sung and whistled by the seven dwarfs in Walt Disney's 1937 film *Snow White*. Apple may be referring to its position as a competitor with IBM, carrying on the heritage of the Seven

Dwarves—a group of 1960s mainframe makers who were dwarfed by IBM's Snow White.

What's Apple's intent in reminding Super Bowl viewers of IBM's Snow White identity? Just recall what weapon the evil queen used to put Snow White down for the count—a poisoned apple.

At the end of its Super Bowl spot, Apple urged viewers to pay attention to an announcement it would make the following week. That occasion turned out to be the unveiling of the Macintosh Office. The system includes the AppleTalk network, which will be able to link IBM PCs with Macintoshes, and the AppleLine, which lets a Macintosh communicate with IBM mainframes using 3270 terminal emulation.



In the context of the Macintosh Office, the idea of a "poisoned Apple" is rather frightening. Alongside the network circuits Apple Computer now builds into its hardware, could there be some secret ROMs with

"worm" codes that will someday fatally infect all IBM computers linked to the Apple Macs, sending cores and CPUs crashing?

Thank goodness this scenario is only a fairy tale.

Computer Furniture: The Hottest Thing Since Waterbeds

The era of specialized computer shows has reached a new milestone. Did you know there's now a trade show devoted solely to computer furniture? Over 60 makers of goods ranging from warm Early American to sleek contemporary styles exhibited at the first Computer & Electronics Furniture Show (CES), held last year in Monterey, Calif. This year's show, to be held March 24th through 26th in San Mateo, Calif., should be even bigger.

What makes computer furniture different from other furniture? Often nothing at all. "Most new computer owners put their hardware on furniture they already have," admitted Jay Shaffer, director of marketing and development for Ethan Allen, speaker at a computer furniture conference held in Tarrytown, N.Y. On the other hand, Shaffer said, "too many companies are turning out furniture designed to make the computer comfortable, instead of

the computer user."

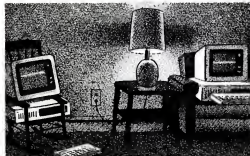
Personal computers have created a need for furniture that fits a new market: the home office. People who use their homes as places to do computer-based work usually must resort to buying office furniture that fits their hardware. Traditional furniture intended for the home could be more attractive and durable, but rarely as comfortable for spending long hours in front of a computer.

Scandinavian designers were the first to strike a successful balance between style, comfort, and computer function in furniture for the home, observed Jeanna Haney, director of public relations for National Fairs, which stages these computer furniture trade shows.

At last year's show, several speakers drew lessons from the growth of the waterbed market. When entrepreneurs introduced waterbeds in the 1960s, the furniture establishment pooh-poohed the giant plastic bags as a hippie fad. Instead, waterbeds

and their accessories became the basis for a successful and lasting industry outside of the mainstream furniture business. Some experts warn home furniture makers that they now risk missing out on the computer boom as well.

The Computer & Electronics Furniture Show is exclusively for the trade—retailers and furniture suppliers—not the general public. If you're eligible and interested in attending, contact National Fairs Inc., 1902 Van



Ness Ave., San Francisco, CA 94109, (415) 474-2300.

Perhaps that's why very few computer dealers attended last year's show. Hanley was surprised, "We thought that stores like ComputerLand would be interested in selling computer furniture as a profitable add-on for their customers who had already bought computers. But the dealers weren't interested

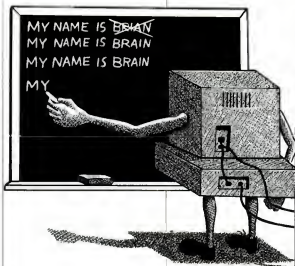
... mainly because the people working in a computer store usually are so specialized they aren't familiar with our field. If a customer came in and asked the salespeople for a computer table with Queen Anne legs, they wouldn't know what to do."

It's a sad fact that most computer sophisticates aren't furniture literate.

CAD-BRAIN Makes A Name for Itself

Improved graphics and color are said to give more personality to computers. This anthropomorphic tendency may be getting a

pixel graphics. In Sord's press release, the computer several times assumed a more human monicker—CAD-BRAIN.



bit beyond the control of one micro-computer maker, however.

Sord Computer, based in New York City, has announced a desktop computer-aided design system called CAD-BRAIN. But a personality seems to be emerging behind the machine's 1,024-by-780

If the new machine was used to write its own announcement, Sord had better sit down and have a good talk with it—or should I say *him*. We suggest the following solution: This dilemma might be resolved simply by bundling a spelling checker with the system's CAD software.

As Willie Sutton Would Say, "That's Where The PCs Are"

A few weeks ago, in the Citibank branch beneath *PC Magazine's* office, I noticed a lone IBM PC sitting on a small table out in the customer area. No expansory signs, no program running. It simply sat there, all plugged in.

But why was there an unescorted PC in the bank? Was it there so customers who used their home computers to balance their checkbooks could record a transaction on the spot? Or was it simply there so customers waiting for an appointment with a loan officer could pass the time writing a letter or playing *Syx*?

Meanwhile, everyone else in the bank totally ignored the PC. If no one claimed it, I planned to put on a frayed blue jumpsuit and arm myself with a clipboard loaded with carbon manifold forms and a dolly piled with empty boxes. With that disguise, I hoped to look official enough to stroll right in, pack up the computer, and haul it off to my apartment.

After a week of watching for an opportunity, I saw how Citibank finally put its PC to work. The system was set up to demonstrate Direct Access—a way you can use Citibank's banking and financial services at home through your computer and modem. The bank even offers a \$100 rebate on the purchase of a Hayes Smartmodem to use Direct Access. For information, call (800) 248-4472.

Direct Access includes free sign up and time on the Dow Jones News/Retrieval service. That perk beats a free toaster.

Unfortunately, Direct Access won't let you do everything you can do through an automatic teller machine. Few stores will accept \$20 bills that were output on a dot matrix printer.



Up Against the Wall—Computer Nerds!

Hey, Jerry Lewis! Move over and make room for Zenith Data System's poster children. They're the computer nerds—sad and scary, but they can be cured. With the right hardware, of course.

This hilarious poster depicts 12 victims of the computer nerd syndrome. Among their symptoms are *wimpy wristosis*, *discus eroticus*, and *programmus incompatibellum*. What's Zenith's remedy? Just call for the company's crack team of Nerd-busters, armed with Zenith Z-100 PCs.

The poster is distributed in college newspapers as part of Zenith's promotional campaign on campuses around the country. In concert with a traveling electronics show, sponsored by *Rolling Stone*, Zenith gives students the opportunity to be photographed while posed behind life-sized cutouts of these computer nerds.

Nerds still get no respect. When will people understand that being a nerd isn't a disease? It's a lifestyle!

—edited by James Langdell

Down Time



BY WINN L. ROSCH

BULLET-286

Wave Mate, Inc.
14009 S. Crenshaw Blvd.
Hawthorne, CA 90250
(213) 978-8600

List Price: \$1,995 with 256K RAM, \$2,395 with 512K, \$2,495 with 640K, \$2,995 with 1 MB.

Requires: IBM PC-XT.

The question of whether I really needed a faster, more powerful computer was easily answered—alas, by IBM and not by me. With the introduction of the AT, IBM set a new performance standard that, owing to my work and my impatience, I knew I would eventually have to comply with. Never mind that my plain old PC thinks so much faster than I do that I can hear it faintly laughing to itself during its idle time between keystrokes.

The obstacle I face in upgrading to an AT is my Teutonic frugality. To me, putting my PC out to pasture just to push an AT into the playroom is plain wasteful. I don't really need another computer. I could try to sell my PC, but the way IBM has been slashing prices, a used PC has about the same resale value as a used Kleenex. The ugly bottom line is that just to get a faster microprocessor chip I must toss out my disk drives, my power supply, my PC's case, and several of the expansion cards I've lovingly

stuffed into its inner workings.

I've tried add-on coprocessor boards, and while they do boost performance, they have built-in shortcomings. Most turn your PC into a mere PC-compatible (you never know what programs will and won't run). Most rely on your PC's innate processor for I/O (input/output), resulting in a disk performance bottleneck and shaky screen handling. And most require a jigsaw puzzle of software to get them running.

The better solution would be to chuck the PC's laggardly 8088 main processor and its support circuitry—essentially the whole system board—and replace it all with something state-of-the-art.

Begging For BULLETS

Alas, there are no high-performance replacement system boards for the ordinary PC, but a replacement system board that packs AT power, a 16-bit data bus, and a 80286 processor into an IBM PC-XT is just coming onto the market—the Wave Mate BULLET-286. I called Wave Mate and, after a short discussion filled with my begging, promising, and lying, I received BULLET-286 serial number 21.

Installation proved easy. The XT system board is held in place by two screws. Switching in the BULLET-286 took me less than 10 minutes—and most of that time was spent searching for a screwdriver.

Wave Mate wisely does not claim that the BULLET-286 will turn your XT into an AT. In

fact, the product was conceived before IBM announced the AT, so it does not have the AT's extra connectors to support full 16-bit expansion cards. You can, however, plug in up to one megabyte of 16-bit wide memory on the main circuit board in 256 kilobit RAM chips, or 640 kilobytes in stacked, two-tier 64K chips.

More Compatible

BULLET-286's incompatibility with the AT may, in fact, be a blessing in disguise. Wave Mate claims that the new board is more compatible with standard PC and XT software than the AT is. PC programs that won't run on the AT—such as the compatibility-test standard *Flight Simulator*—purr happily away on the BULLET-286.

The secret is about a dozen and a half Programmed Array Logic (PAL) chips on the BULLET-286 that translate standard PC code into 80286-compatible instructions. When a PC program asks the Wave Mate microprocessor to do something that the 80286 doesn't know how to do, the PAL chips intercept the conflicting instruction and convert it into the equivalent 80286 instruction.

Compared to a standard PC or XT, the BULLET-286 is indeed quick, ranging from 50 to 450 percent faster, depending on whether the comparison program does I/O or not. (To make the high-speed BULLET-286 compatible with standard low-speed PC peripherals, a slight delay is built into its I/O processing.)

Speaking of Computers: Mirror, Mirror, on the Wall

"One time I heard [Microsoft president] Bill Gates say he wanted to be the IBM of the software industry. I have a hunch IBM wants to be the IBM of the software industry."

—Dr. Ronnie Ward
Future Computing

Speed Demon

The BULLET-286 flies through processor-intensive tasks such as heavy number crunching and program compiling. With a spinnaker-sized 1-2-3 spreadsheet, it roared through recalculation about 250 percent faster than a PC could have. The BULLET-286 also ground through program-assembly code 250 percent faster than a plain PC did—and 50 percent faster than it took an honest-to-goodness AT.

Maybe it wasn't quite a fair fight. Wave Mate endows the standard BULLET-286 with an 80287 math-coprocessor; the AT-cum-challenger was not so equipped. Then again, the IBM assembler isn't supposed to use the 80287.

The AT still has a definite edge in disk access and screen-painting. An AT chews data from its hard disk in two-byte gulps, while the BULLET-286 must take single bytes from the XT's 8-bit data bus. Nevertheless, the BULLET-286 is 50 percent faster than a standard PC or XT even when doing extensive hard or floppy disk handling.

Compatibility Clash

Unlike the AT, the BULLET-286 is PC-compatible enough to run every standard PC program I slid into its drive slot—except for IBM's BASICA (or even BASIC). Like all PC clones, the Wave Mate does not include part of the BASIC interpreter in its ROM memory, consequently it is not compatible with the standard IBM version of BASIC. It does, however, run GWBASIC and Compaq BASIC fine—and fast!

Alas, the BULLET-286 is not cheap—roughly \$2,500 with 640K of RAM and coprocessor. In the near future, however, the BULLET-286 and products like it may be available from more familiar names and at friendlier prices.

"We decided waiting *another* decade for the standard in business software was too long."

Instead, Macola, Inc. has taken the Standard in Business Applications Software for *minicomputers*, from MCBA,[®] converted it to R/M COBOL for 16-bit computers, and created, we believe, the *Micro-Standard*.

Hundreds of microcomputer business applications packages from scores of programmers were rushed to market during the last ten years as the microcomputer became an everyday business tool.

Many were fine packages—filling niches, stop-gapping problems, allowing the businessperson to *maintain*—probably not drop behind, but definitely not surge ahead.

What was missing from these packages varied from package-to-package. Some lacked power. Some, simplicity. Others, clarity. Most lacked real integration.

Introducing Some Old Software

During those ten years, Mini-Computer Business Applications, Inc. (MCBA), was quietly establishing the standard for Business Applications Software for minicomputers.

Today, much of the new software developed by other companies boasts compatibility with MCBA's packages.

Macola, Inc., finding the current micro-packages unacceptable against the standards they sought, and realizing the time

involved in developing their own set of packages, approached MCBA, obtained the rights to convert the powerful minicomputer software, then did just that.

Thanks to Macola, the microcomputer industry can now run the *Micro-Standard* in the following financial software...

Accounts Receivable (A/R), General Ledger (G/L), Accounts Payable (A/P), Payroll (PR), Inventory Management (I/M), Customer Order Processing (COP), Bill of Material Processor (BOMP) and Assets and Depreciation (A/D).

This menu-driven financial software is easy to run, the User's Manual, easy to understand and the entire system, easy to afford.

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show you how Macola Financial Software will handle your *specific needs*.

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P.O. Box 485, 181 South Main St.
Marion, Ohio 43302

Tallgrass System Gets It on Tape

Kansas manufacturer casts its lot with a different technology.

BY CHARLES BERMANT

OVERLAND PARK, Kans.—After earning a reputation as a manufacturer of hard disk and tape backup subsystems, Tallgrass Technologies is seeking to change the face of data storage with the introduction of a DOS-like tape operating format.

Called PC/T, the system is being unveiled along with the company's entirely revamped product line. In hope of encouraging its use, Tallgrass is allowing many of PC/T's key elements to enter into the public domain. The system has received endorsement and support from companies such as Hewlett-Packard and 3M, but Tallgrass's goal of making PC/T an industry standard will not come easily.

"We'll not support any new standard until it is proven in the marketplace," says Sysgen president Richard Tam. "Nobody has been aggressive enough in selling such a concept. I'd be surprised to see an agreement on a standard before the third or fourth quarter of this year."

Aware of these risks, Tallgrass is pushing ahead, confident that word of mouth and the system's obvious attributes will turn PC/T into an industry standard.

Forging Ahead

"If tape is going to survive, it will need to be inexpensive, foolproof, and have the functionality of a floppy," says Tallgrass vice-president of marketing Steve Volk. "We feel that it can be a reliable on-line archival medium."

While users can't yet boot off the tape system, PC/T can perform many DOS functions. It

format. "It wasn't suitable, was too expensive, and didn't permit overwriting or preserve data integrity."

Tape, Volk adds, is also an efficient means of transporting data: transmitting a 10-megabyte file by modem is extremely time-consuming, but it's easy to send a 60-megabyte tape by

feasible that disk and tape could talk. But we've always worked under two assumptions: that disks would increase in capacity and tape would decrease in cost."

Now Tallgrass's manufacturing force is working around the clock cranking out the new units. Company president Dave Allen, who spends much of his time tinkering in the back shop and listening to employee ideas and complaints, says, "This isn't like Silicon Valley; our people are much more dedicated. They aren't going to stay here 3 months and then go across the street."

Casting the Lot

"Our lot has been cast on tape," concedes Allen. "If it fails, we'll have a rough ride."

The Tallgrass sales force is "on a mission to sell tape," according to one account representative, and is getting good response from business clients. The company also covers 27 overseas markets, where executives say people recognize the need for backup.

"They are more sophisticated users who want to get the maximum use and advantage out of their PCs," says Jim Worrell, director of international sales and marketing. "In the United States, a PC is more of a casual purchase."

This year, Tallgrass also plans to apply PC/T to a half-height disk format, dubbed "Grasshopper," that utilizes a 3½-inch cartridge size. Volk said that using optical disk technology to replace some tape applications is another option being explored.

IBM, which has not supported tape backup, is reportedly watching PC/T's progress, as are Tallgrass's competitors. But resistance remains. "We applaud them for their efforts in getting the standard going," says Rob Wight of Maynard Technology. "But our approach has been that we already make a competitive product."

Wight, while favorably citing PC/T's capabilities and ease of use, says that because of its own new product, it is unlikely that Maynard would market a PC/T-based product. ■



Dave Allen (left) and Steve Volk (right) of Tallgrass Technologies

contains a powerful error-correction capability and allows the selective appending and revising of stored files.

Initially, Tallgrass used the QIC-24 format, the streaming process that is the standard for minicomputer applications.

"We tried to mold it, then gave up," Volk said of the QIC

overnight courier. Furthermore, he says, the cost of tape storage is \$.50 cents a megabyte as opposed to \$6 a megabyte for a floppy disk or \$10 a megabyte for a cartridge.

"When we first offered the product around, we got very little interest," Volk says. "People said it wasn't technically

SPEAKING OF COMPUTERS

How Many PCs? Who Knows?

"The personal-computer industry is hard put to produce inventory numbers. Individual companies don't give them out, and there are no reliable industry-wide figures. The net result: The industry floats along on guesswork and rumor."

—Kelly Walker, "Counter-productive," *Forbes*, December 17, 1984

Rumors of the Highest Quality

"Every new product from IBM is always better before it's announced than after it's announced."

—Rod Canion, President and CEO of Compaq Computer Corp.

Don't Take Chances With Taxes...

The image shows a close-up of a man's face as he looks at a computer monitor. The monitor displays the IRS Form 990-EZ, which is titled "Don't Take Chances With Taxes". The form includes sections for Filing Status, Exemptions, and various tax-related questions. The man's face is partially visible in the foreground, showing his eyes and nose as he focuses on the screen.

Don't Take Chances With Taxes

Filing Status

- Single
- Married filing joint return (even if only one had income)
- Married filing separate return Enter spouse's social security no. above and full name here
- Head of household (with qualifying person) (See page 5 of instructions.) or the qualifying person is your child or grandchild who has not yet reached age 18
- Widow(er) with dependent child (Year spouse died > 19) (See page 5 of instructions.)

Exemptions

- a. Always check the appropriate boxes checked below
- b. Blind
- c. Elderly or disabled
- d. Disabled

Form 990-EZ

Part I

Do you want \$1 to go to this fund? ☐ Yes ☒ No

If joint return, does your spouse want \$1 to go to this fund? ☐ Yes ☒ No

Part II

Enter number of boxes checked on 6a and b:

Enter number of children attending GC:

Part III

1. Number of deaths lived at your home:

2. Did dependent have income of \$1,000 or more:

3. Did you receive:

Part IV

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Part LXV

1. Enter number

Put your trust in the software the professionals use.

Taxes are serious business, and they're more complicated than most people realize. Computers can help ...but only if you choose the right software. And you may not know until you take it home that the tax software you've chosen doesn't have the important ifs and buts of the tax code built-in, or doesn't produce IRS-accepted printouts for the *entire* return, including supporting statements, or doesn't show you all the

tax breaks you deserve because it's not complete, or doesn't save you time because it's not fully automatic, or doesn't give you unlimited itemizing and year-round record-keeping, and then requires you to be a computer whiz!

But there's one tax software that stands out because it does the job right. And that's probably why it's been the #1 seller in tax software with both professionals and indi-

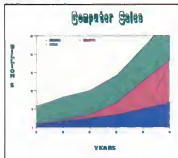
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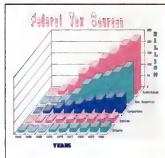
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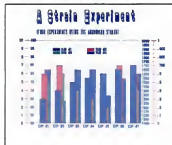
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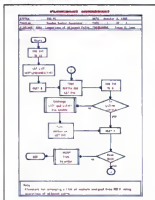
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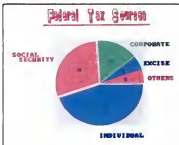
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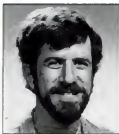
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* HARDWARE CONFIGURATION: IBM-PC, 128K Dual Disk Drive, Graphics Adapter, Dot Matrix Printer, and/or XT Printer, Compaq, Columbia and Eagle Computers.

Parity Check



BY STEPHEN MANES

"I can explain all the computer terms ever invented," boasted Mr. H. Dumpty in a recent interview, "and a good many that haven't been invented just yet."

"When I use a word, it means just what I choose it to mean—neither more nor less," he added from his lofty perch at the pinnacle of the looking-glass world of computer lexicography. "The question is which is to be master—that is all. And the forward-looking (by which I mean devious) computer industry has adopted my philosophy lock, stock, and disk drive."

"Really, some of the commonest usages in the business are too goofy for words."

Chortling gleefully at his own research, Mr. Dumpty lost his balance, and a heavy crash abruptly terminated the session. Dumpty Associates, his consulting firm, has kindly permitted us to reprint portions of his work as a fitting epitaph to this farsighted pioneer.

The Dumpty Dictionary

IBM-compatible: not IBM-compatible.

fully IBM-compatible: somewhat IBM-compatible, but won't run BASIC programs.

100% IBM-compatible: compatible with most available hardware and software, but not with the blockbusters IBM always introduces the day after tomorrow.

lap-top: smaller and lighter than the average secretary.

portable: smaller and lighter than the average refrigerator.

transportable: neither chained to a wall nor attached to an alarm system.

hard disk: a device that allows naive users to delete vast quantities of data with simple mnemonic commands.

mouse: a peripheral originally christened "vermiform appendix" because of its functional resemblance, renamed for its appropriateness as a cat toy.

printer: an electromechanical paper-shredding device.

modem: a peripheral used in the unsuccessful attempt to get two computers to communicate with each other.

network: an electronic means of allowing more than one person at a time to corrupt, trash, or otherwise cause permanent damage to useful information.

documentation: a perplexing linen-bound accessory resorted to only in situations of dire need when friends and dealers are unavailable, usually employed solely as a decorative bookend.

Maine in June

user-friendly: supplied with a full-color manual.

very user-friendly: supplied with a disk-and-audiotape tutorial so the user needn't bother with the full-color manual.

extremely user-friendly: supplied with a mouse so that the computer user needn't bother with the disk-and-audiotape tutorial, the full-color manual, or

the program itself.

easy to learn: hard to use.

easy to use: hard to learn.

easy to learn and use: won't do what you want it to.

powerful: hard to learn and use.

menu-driven: easy to learn.

copy-protection: (1) a clever method of preventing incompetent pirates from stealing software and legitimate customers from using it; (2) a means of distinguishing honest users from thieves by preventing larceny by the former but not the latter.

warranty: an unconditional guarantee that the program purchased is actually included on the disk in the box.

version 1.0: bugger than Maine in June; cats data.

version 1.1: cats data only occasionally, upgrade free to avoid litigation by disgruntled users of version 1.0.

version 2.0: the version originally planned as the first release (except for a couple of data-eating bugs that just won't seem to go away), no free upgrades or the company would go bankrupt.

version 3.0: the revision in the works when the company goes bankrupt.

Magic Transformations

spreadsheet: a program that gives the user quick and easy access to a wide variety of highly detailed reports based on highly inaccurate assumptions.

word processor: software that magically transforms its user into a professional author.

thought processor: an electronic version of the indented outline procedure that thinking people instantly abandon upon graduation from high school.

business graphics: popular with managers who understand neither decimals, fractions, percentages, Roman numerals, nor pi, but have more than a passing acquaintance with pies and bars.

database manager: a program that allows the user to manipulate data in every conceivable way except the absolutely essential one he or she conceives of the day after entering 20 megabytes of raw information.

project manager: software for generating fantasy scenarios of amazing optimism; proven in computer firms, where it is extremely successful at scheduling advertising campaigns for unavailable products.

integrated software: a single product that deftly performs hundreds of functions the user never needs and awkwardly performs the half-dozen he uses constantly.

windows: a method of dividing a computer screen into two or more unusably tiny portions.

Any Day Now

now available: available any day now.

available soon: available in a year or so.

available May 1: version 1.0 may ship to dealers August 1.

standard: similar to something else on the market.

backup: the duplicate copy of crucial data that no one bothered to make; used only in an abstract sense.

computer journalist: (1) a data processing manager who can't write a coherent English sentence; (2) a writer who can produce a definitive opinion on a product after spending an hour with its manual; (3) a person with an insatiable lust for free hardware and software; (4) a harmless drudge.

Speaking of Computers: Won't Get Fooled Again

"Customers just don't believe what they hear any more, says Apple president John Sculley. 'When IBM announces something early,' he says, 'everyone believes it. When we do, they start wondering. And when every other company prematurely announces, nobody believes it.'"

—*"Tardy Technology"* by Dennis Kneale
The Wall Street Journal, January 8, 1985

PRODUCT REVIEW

Ryan-McFarland BASIC: A Critical View

A word to the wise: Not all BASICs are created equal.

BY JOHN M. WORAM

According to recent news releases from Ryan-McFarland, the company's new RM/BASIC is "designed specifically for high-level business software solutions." Similar to other IBM BASICs (but not PC BASIC), "RM/BASIC minimizes the conversion effort required to bring existing applications now running on other IBM computers to the PC family." This is the third in a series of BASIC reviews.

RM/BASIC
Ryan-McFarland Corporation
Language Products Group
9057 Sequel Dr.
Aptos, CA 95003
(408) 662-2522
List Price: \$600
Requires: 128K RAM (192K recommended), DOS 2.x.

For users whose only previous BASIC programming experience is with PC versions of the language, RM/BASIC can be very tough going. The manual states that RM/BASIC is like a superset of mainframe IBM System 23 BASIC, but little else warns you of what lies ahead. Users with mainframe experience may have an easier time of it, but for everyone else, it's just, "here goes nothing."

Some Discoveries

For better or worse, this BASIC is quite unlike other PC BASICs I've encountered. During my initial shakedown session with RM/BASIC, I discovered that:

1. Arrays may have a maximum of two dimensions.
2. While in BASIC, you may momentarily return to DOS by typing SYSTEM and then return to BASIC by typing EXIT. In BASIC, the FILES statement is not supported, so to see a directory listing you must type SYSTEM "DIR". As soon as you press the Enter key, the directory listing vanishes and you are back in RM/BASIC. You use the QUIT command to leave RM/BASIC permanently.
3. ASCII characters 1-31 are

actually displayed on-screen, in lieu of the familiar procedures of other BASICs. For example, PRINT CHR\$(4) displays a small diamond instead of sounding a beep, CHR\$(12) shows a female symbol instead of issuing a form feed, and so on. Typing PRINT BELL takes care of the beep, and you can get the form feed with PRINT NEWPAGE.

4. Although RM/BASIC uses a total of 176 key words, only about 80 of them are similar to

key words in Microsoft's PC BASIC. This is not a complaint—it's just an observation for those who may be considering RM/BASIC as a replacement for PC BASIC. Personally, I can adjust to using PRINT NEWPAGE instead of CLS, but I do miss the LOCATE and SWAP statements.

The Bottom Line

RM/BASIC tries to print everything on the bottom line, which then scrolls upwards as new information is added below. Getting it to do otherwise takes a heroic effort. For example, to display a character string starting in row 5, column 3, you must type

PRINT FIELDS
"5, 3, C20": \$\$

Since you must specify the maximum length of the string, if \$\$ happens to be longer than the 20 characters permitted by the C20 parameter, program execution terminates with an error message. Furthermore, the next PRINT statement will not show up on the next line. Instead, the display keeps going back to the bottom of the screen unless you write explicit instructions for each and every statement.

I haven't yet discovered an RM/BASIC substitute for SWAP. Of course, it is possible to swap two variables for a temporary third variable (as in TEMP = A: A = B: B = TEMP). However, I would have expected a business package to offer more, not less, flexibility in this particular area.

As a further annoyance, when a program terminates, a message that tells you so appears at the bottom of the screen, and everything else scrolls upwards. Other BASICs allow a line such as K\$ = IN-

(continued on next page)

A Game for High-Tech, High Rollers

Do you dream of starting up a high-tech company and getting a piece of the \$6 billion of venture capital that's been invested in the past few years? Is your idea of nirvana having your dream company go public—leaving you with a pile of stock worth millions?

In the real world, of course, your high-tech fortune might exist only on paper. To escape this disappointment, you can experience your venture adventure by playing *Big Bucks: The High Tech, Venture Capital Game*. With this board game you can handle as much as \$5 million—in play money.

Big Bucks was created by a public relations agency that has helped guide several high-tech clients through the gold mines and mine fields

of venture capital. "Now we're probably the only PR firm that's selling a product of its own," says Jeffrey Raymond, president of Raymond Kowal & Wicks.

You start at square one with \$150K—your lifetime savings. This money slips away at a rate of at least \$5K with every move you make. The squares on the board chart your company's progress from the day you "Walk out on current employer, collect \$5K" through "No one buys Release 2.0, pay \$50K" and "Your office furniture becomes trendy, collect \$10K."

Ah, if only being a high-tech tycoon was so simple! But to play this game you must brave the "Venture" and "Reality" cards. Some have good news: "The lead guy thinks you look just like

Charlie Chaplin. Move ahead 6 spaces." But there's bad news more often, such as "Your director of development joins a religious cult. He abstains from contact with any electrical device."

That's the tough luck, but no worse than the risks faced by a real computer company. And, it is possible to win—moving into "Nirvana"—rather than Chapter 7.

To get into the game, order *Big Bucks* from Raymond Kowal & Wicks, P.O. Box 28, Cambridge, MA 02142. The price for this board game is \$18.95 plus \$2 for postage and handling. A computerized, PC-compatible version is in the works. In the meantime, *Big Bucks* is compatible with any horizontal surface.

—James Langdell

Critical View continued
PUTS(1) to keep such things from happening, but that doesn't seem to work here. It's not a big deal, I suppose, but all these annoyances make it that much harder to control screen action. Perhaps mainframers are used to this sort of thing.

RM/BASIC's graphics capabilities are not quite up to those of other BASICs. Although it's

easy enough to draw lines, boxes, and circles, the FILL statement (analogous to PC BASIC's PAINT command) limits the user to filling in circles and rectangles of known dimension.

For example, you can draw a solid circle with a specified radius with the FILL CIRCLE statement, but if you draw an ellipse, there appears to be no way to fill it in. Even filling in a tri-

angle is difficult. This may not be a handicap for most business-graphics displays, but it makes it difficult to go beyond simple line, bar, and circle charts.

Since RM/BASIC has dynamic syntax-checking, errors are flagged as they are written, and a message appears:

```
100 AS = 34
***** RMB2123:
```

(Numeric expressions may not be assigned to character variables.) The exclamation mark points to where the error occurs. An appendix in the manual lists all error messages, but offers no more explanation than what already appears on the screen.

When it comes to making changes, RM/BASIC lacks the advanced editing facilities of PC BASIC. It doesn't support full-screen editing, so you must either re-enter the entire line, or type CHANGE *xxx*, which works the way PC BASIC's EDIT *xxx* does. Neither the Esc key nor any of the ten function keys seem to have any effect.

A Math Whiz

On the plus side, RM/BASIC seems to be the most accurate BASIC I've seen, with 15-digit accuracy displayed in the default condition. However, getting a hard-copy printout of the calculations in my demo FOR...NEXT math loop is not as simple as in other BASICs. Ctrl-PrtSc doesn't work, and the LPRINT statement isn't supported. I was hoping to find help in the index, but that opened a new can of worms.

RM/BASIC's index must have been written by one of those professional index writers who simply noted every time an interesting word appeared. For example, while trying to figure out how to get my printer to work, I tried the OPEN statement, which the index lists on six different pages. Needless to say, only one of these (the fourth page) has any useful information about the OPEN statement. By the way, if the included Help-Files diskette is in the default drive, typing HELP OPEN displays a summary of the OPEN statement section of the manual.

Summing Up

This is a very expensive package (\$600) that may be most helpful to big system users who, in looking down at the PC, want something that closely resembles mainframe BASIC. But for users who look up to the PC, RM/BASIC doesn't compare favorably with other BASICs that cost much less—or, in the case of PC BASIC, come free with the purchase of DOS. ■

COMPARISON CHART

Program Features	RM/BASIC	Microsoft PC BASIC
Program Size (bytes)	234,752	25,984 (BASICA V2.0)
	321,664 Help Messages	26,880 (BASICA V3.0)
Minimum Memory required	192K (128K for execute-only)	48K
Space Remaining (in a 320K system)	No information given	60,865
Programs saved as	ASCII file or Object code	ASCII file or Compressed Binary
Simple Bubble-Sort	344 ASCII	314 ASCII
Program saved in (bytes)	1452 object code	237 compressed-binary
Directly Compatible with PC BASIC	No	N/A
Extended ASCII (128-255)	Yes	Yes
Line Numbers	Required	Required
Labels	Yes	No
Dynamic Syntax Checking	Yes	No
PC BASIC Keywords	80	180
Additional Keywords	96	None
Dynamic String Length	No (18 default)	Yes
Maximum String Length	255	255
Numeric Data (Ranges)		
Line Numbers	1-99999	0-65529
Integer (4 bytes)	-2147483648/+2147483647	-32768/+32767 (2 bytes)
Decimal (claimed)	0.1E-128/+0.9999E+127	2.934E-39/+1.70E+38
(observed)	1E-129/+9.9999E+126	Same as claimed
542859.9114 on HP41 =	542859.911377022	542860
Decimal Accuracy	14 (15th digit rounded)	6(7th digit may be incorrect)
Execution Speed Comparisons (in Min:Sec)		
Bubble-Sort of 50	1:27	1:25
Random Numbers		
Graphics Demo	Not tested	0:24
Draw and Paint One Circle	0:25	0:09
Math Loop	0:20	0:04
Screen-Switching	Not documented	Yes
Documentation		
Content	Fair	Good
Clarity of Presentation	Poor	Poor
Physical Appearance	Adequate	Very Good
Index	Poor	Good
Slip-Case for Manual	Yes	Yes

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People in the News: Esther Dyson

A woman of dedication with a love of exploration, research, and analysis.

BY WINN L. ROSCH

NEW YORK—By her own admission, Esther Dyson lacks the formal qualifications needed to be a microcomputer industry analyst—no engineering education, no M.B.A., no business school at all. Yet she is among the most-quoted soothsayers in the business.

Hardware and software promoters alike trek across the globe to catch her eye—and they hope—snag a favorable comment in *RELease 1.0*, the more-than-monthly (about 16 issues a year) microcomputer newsletter she writes and edits for the investment community.

Instead of degrees, Dyson lists her credentials as 7-day-a-week dedication and an inherited love of exploration, research, and analysis. The Swiss-born Dyson's mother is a mathematician; her father is the renowned physicist Freeman Dyson.

"I have the aptitude, but no interest in competing with him," she explains. Hence, she has sought her intellectual adventures outside academia. "I supposedly majored in Economics at Harvard, but I actually spent all my time at the *Crimson*."

Business Beat

"*Forbes* was my business school," she continues. Through her reporting at *Forbes* from 1974 to 1977, she met and interviewed top business people. Yet the high point of her stay, she says, proved to be a portentous visit to Japan—she paid her own way—to write a story about the Japanese threat to the domestic computer industry.

During the next 5 years, she learned the lay of Wall Street working as an analyst for investment houses. More important (to her), she learned to respect and appreciate the power of

venture capital from watching Federal Express go through \$100 million before turning a profit.

In 1982, she gave up her secure career and took a 30 percent pay cut to join Benjamin M. Rosen and work on *RELease 1.0*, his microcomputer news-



Esther Dyson

letter. Dyson explains the reason for her switch: "I love taking risks. My business sense is better applied to other people than my own business."

When Rosen's other endeavors made the newsletter too much of a conflict of interest, Dyson bought him out. Since then, she has expanded her company, EDventure Holdings, Inc., to include consulting and holding seminars/forums (with a list of speakers reading like a scorecard of top industry executives).

Dyson's Park Avenue office is bright, open, and airy without a trace of Wall Street stodginess. Thousands of dollars of the latest software, sent to lure her praise, lie in disarray on a tabletop. To interview her, you must compete for space in the conference room with a diverse array of hardware from compa-

nies ranging from Apple to Radio Shack.

Dyson, too, is computer casual in sweater and simple wool skirt sans both makeup and jewelry. Her fine, straight hair is clipped in the classic minimum-maintenance/functional style, light brown, matching her eyes.

I join her for a private East Coast premiere of a new software package, unveiled by an entrepreneur who acts more as ringmaster than product demonstrator.

Halfway through the show—after the dog but before the pony—Dyson briefly slips out for a mug of java and on her return quietly confides, "I have a health problem: demos always put me to sleep." As the entrepreneur packs away his whips and hoops, proud of his product, his presentation, and himself, he confidently asks Dyson for her thoughts and comments.

Her verdict: Nothing new. She's seen it all before.

Aghast, the entrepreneur proclaims no other product has all the features, capabilities, and pretenses of this, his favorite child—at least none he has ever seen.

More as enlightenment than as a retort, Dyson rattles off half a dozen program titles and outlines why the product, with little to distinguish itself from the competition, will likely not be successful.

Today and Tomorrow

The software in question doesn't even earn space in her newsletter. "I don't forecast the demise of a product and hasten it with my prediction," she notes, "although if the product is important, I may draw attention to its shortcomings. I don't like to say awful things. I prefer silence."

She emphasizes that she sells insight rather than news. "I'm not a journalist," she ex-

plained. "I'd rather see the positive effects of sharing my knowledge."

Besides her carefully-honed analytic abilities, Dyson feels that her success is built upon—well—her success. "I have better access to information," she explained. "I get to see products before they are announced; I can talk to anyone in the country. And my diplomatic passport allows me to travel anywhere in the world."

But she sees the success of her newsletter—and the current personal computer industry—as short-lived. "In the long term, I think the PC industry will go the way of the engine industry," she says, noting that while engines are important parts of everything from cars to refrigerators, few people give them a second thought. "Most people are interested in how computers are used and applied, not in the hardware. It's several, maybe 5, years off, but the signs are there now. This was the peak year for COMDEX PCs and probably my newsletter. The excitement is elsewhere, particularly in artificial intelligence."

Predicting the demise of her own business doesn't bother her. "I have no interest in building an empire," she explains. "I don't have an answer for what I want to do next. I could follow Ben Rosen into venture capital or I could be a consultant or be on the board of directors of some company."

Perhaps Dyson's only regret is the all-consuming intensity she's given her work. "Lamentably, my other interests have become latent. I would like to have more of a personal life than what I have been having," she quips. "I fancy myself a good writer, but I haven't written anything but useful prose lately. If I weren't connected with the PC industry, I think I would be a novelist." ■

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PC Update



BY TOM BADGETT

There's good news about personal computers and printers coming your way. Heads up! You're on the brink of rapid changes in the way you use your PC, maybe even in the way you think about computing in general. Exciting signs are all around, though many computer experts don't agree on exactly what they mean.

A look at what's happening to printers will tell you something about the near future. All the major printer manufacturers now offer small, relatively fast printers with professional features and low prices. A recent market study showed a baseline of surprisingly sophisticated features: 100 cps or faster speed; selectable fonts, including an enhanced or emphasized

mode for "near letter quality"; small size; platen or tractor feed so you can use letterhead or computer forms; and a price under \$300.

My first 100 cps printer cost \$2,995, made a horrible racket, weighed a ton, and produced almost unreadable print. Of course it was rugged as a mule, and I treated it like one. It's probably still working, and the only thing I ever had to do to it was replace the printhead for about \$200. It's too early to say how well the new breed of low-priced printers will hold up, but who cares? You can replace the printhead for about \$30. Takes about 10 minutes. If you can get the rest of the printer to last through two printheads, you don't have to worry about fixing anything else. If it breaks, throw it away. Now anyone who has a computer can have a printer.

The Typewriter Lives

For a while there, everybody said the typewriter companies were through. Who would spend \$1,000 to \$1,500 for a high-quality electric typewriter when, for a little more, you could have a computer and a word processor? The ingenuity, ferocity, and dedication of the

marked beast is truly amazing. After a brief gathering of resources, the typewriter people came up with a line of electronic portables with LCD displays, character editing, programmable fonts, graphics, color, and RS-232 ports. That one magic piece of circuitry—maybe 4 or 5 parts for the interface itself—will resurrect the typewriter, because now these machines can talk to computers, they can be used as portable terminals (some, like the soon-to-be-released Casio C-30, even have built-in modems), and they can double as a typewriter and a computer printer.

Shifting Trends

These developments demonstrate two things. First, they confirm the trend toward smaller, more powerful electronic devices. And they portend a shift in the way computers will be built and used. Sure, the future still holds a place for the PC-like desktop machine. Current users will have more computing power than the newcomers will, and they'll probably understand how to use it more effectively. But the days of agonizing over how to spend those thousands of dollars for the one computer system you'll use for everything

may be just about over.

Instead, increasingly intelligent devices will handle specific jobs. These intelligent tools will change the concept of the "computer." Not all computer-like jobs require disk storage or calculating power. But with machines like the new typewriters you can do the primary job you bought the tool for, and hook up to computers at home or work for bigger jobs. You may have another "tool" by the telephone for autodialing and videotex links, another by the television for games and family entertainment, and something else in the kitchen for those jobs the PC still can't do effectively: recipe storage, meal planning, and checkbook balancing.

I've had a desktop computer since 1975, and I love my PC. As IBM puts more power into its box, I'll upgrade to the latest version. But I hope I can avoid a myopic approach to computing that sees bigger, faster, multi-purpose machines as the only future. Smaller, cheaper, somewhat more dedicated machines will be there too. The two technologies are moving rapidly apart, but they will coexist to give the world more truly useful computer power than either could provide alone.

CALENDAR OF EVENTS

DATE	EVENT	COMMENT	LOCATION	CONTACT
April 18-19	Office Graphics and Imaging	Focusing on graphics imaging technologies and their impact on the office environment.	Westin Galleria Dallas, TX	Gartner Group, Inc. 72 Cummings Point Rd. P.O. Box 10212 Stamford, CT 06904 (203) 967-6723
April 24-26	UNIX Systems Expo	Conference for users, resellers, and producers of UNIX-based hardware and software.	Moscone Center San Francisco, CA	Computer Faire, Inc. 181 Wells Ave. Newton, MA 02159 (617) 965-8350 (415) 364-4294 (CA office)
April 30-May 2	Sixth National Online Meeting	Meetings and exhibitions for users and suppliers of on-line database systems.	Sheraton Centre Hotel New York, NY	National Online Meeting Learned Information, Inc. 143 Old Marlton Pike Medford, NJ 08055 (609) 654-6266

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Kennedy's Corner



BY DON KENNEDY

Hi Ho! Hi Ho! It's off the cliff we go.

So sing the three-piece suiters with their briefcases, the blindfolded tall dwarves of yet another Apple Computer ad hinting that there's something not quite right with people who use IBM computers. It could just be that the awards Apple received for last year's "1984" commercial went to its head, but it sure seems as if the ad agency doing these TV spots for Apple has fallen in love with its own navel. Or maybe it's Steve Jobs's navel, now that *Playboy* has called him a "Zillionaire!!!!" on its cover and made him the subject of a *Playboy* interview.

It's clear that the people who make computers for the rest of us have developed a rather serious case of paranoia about the people who make computers for the majority of us. It's one thing for Pepsi Cola to stand up all feisty, like Chairwoman Dearest Joan Crawford, and challenge the big boys in Atlanta to a taste test. It's quite another to run out in the street like Kevin McCarthy at the end of *Invasion of the Body Snatchers*, raving that behind every keyboard there's a conformist.

High Drama?

Consider the other moments of high drama that Apple Computer has brought television viewers in the past 12 months. One of my favorites is the "Syntax Error Chainsaw Mas-

sacre." The one where a staid, rather pleasant-looking businessman grows angrier and angrier the more he tries to work with his computer, a machine that looks remarkably like a IBM PC. Finally, he has had enough of the "Syntax Error" message on the screen and grabs a chainsaw and demolishes the contraption.

A lot of people at COMDEX last fall thought that ad was either (a) outrageous or (b) highly original. Some of the wine-and-cheese types thought it was both. Nobody seemed to catch on that it was merely a combination of "The Dukes of Hazard" and the old Anacin commercials where they said, "Sure you have a headache, but don't take it out on your mother."

I'm not really concerned about the measures Apple's ad agency will take to win another couple of awards from a group of creative types whose goal in life is to create the next *Mister Whipple*. I'm a lot more worried about what those besneakered geniuses in Cupertino are turning into. The symptoms are worrisome, to say the least.

Innocent Beginnings

It all started innocently enough when the country was young, and every laid-back kid who had a garage and some microchips could dream of be-

coming a millionaire by the end of the week. Everybody was friends, and everybody could get rich. Then along came International Business Machines.

Most of the people at IBM had never worked in a garage, so automatically they were under suspicion. Very few wore sneakers and shot hoops on their lunch hour—more black marks against them. Finally—the straw that broke the camel's back—the guys at IBM made a machine that worked better than the ones the laid-back kids were making.

So, like Mickey Rooney and the gang, they rolled up their sleeves and decided to go back to the garage and beat the pants off the establishment. Right? Right. But this isn't a movie. The machines they made still couldn't hold a candle to IBM's Personal Computer as business tools. As drawing tools, maybe, but who is going to spend thousands of dollars to see how neat he or she can doodle?

Bad Karma

The next step, of course, was predictable. If you can't beat 'em, attack 'em. Like the ghost of Truman Capote, bitchiness has been elevated to a science. The ad agency is having fun being nasty, and artsy directors are letting their imaginations run wild.

But look what it says about the kids in the Valley. They started out as long-haired flower children who traveled to the Far East seeking the wisdom of gentle monks. Now something's slipped loose inside. Call it bad karma, if you wish, but we're reaching a point where we have to forget Meemee and start talking about the Screaming Stevies. Look at the classic "1984" commercial, the one where the woman in men's underwear runs around in a building populated by extras from *Night of the Living Dead*. She throws a hammer at Big Brother on the TV screen, and we're all supposed to figure that the Macintosh will free us from IBM's mind-numbing sameness.

The others are just variations on this theme of progressive paranoia, as we're treated to the Screaming Stevies smashing IBM machines with sledgehammers, slicing them with buzz saws, and finally, sending all of us who use IBM PCs blithely over the edge of a cliff.

Apple has come full circle from attacking the people who won't do business with it to attacking the machines it is competing against to attacking the people who won't do business with Apple.

Desperate Selling

What's interesting is that all of this is being done in an almost desperate attempt to sell a machine. Think about that, if you will, and remember that these are the same people who cut their teeth on counterculture billy clubs a decade or two ago. They didn't like machines then. In fact, many of them didn't like plumbing. So how do the Screaming Stevies assuage their nagging discomfort at becoming really rich by selling machines and at the same time get stockbrokers like Jerry Rubin to go out and buy them?

With hammers and sledgehammers and chainsaws and people falling off cliffs.

Do We Really Need to Know?

Dozens of manufacturers contact *PC Magazine* every day . . . but sometimes we wonder why. A few computer companies find an excuse nearly every day to send us a press release. One, "for immediate release," broke the news that the company was "pleased to announce a new one page color flyer" about a product. I could hardly wait to turn the page . . .

Other manufacturers inform us about products that we wouldn't let get near our micros; for example, Klotz All Purpose Penetrating Oil. The press release says Klotz has "virtually unlimited uses," so it must have some computer application. But what do they expect us to do—spray Klotz oil around our PCs and hope the goo will penetrate where it does some good?

—James Langdell

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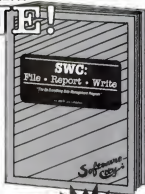
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PCjr Renaissance

IBM PCjrs have gained new market strength and are disappearing off the store shelves and into your homes. What do you use them for? PC Magazine wants to know.

Something interesting happened this winter. PCjr survived. And not only did it survive, it prospered. In some retail stores, it actually outsold the Apple IIe and IIc 4 to 1. Estimates vary from under 100,000 to over 250,000 PCjrs sold since IBM "fixed" the machine last summer.

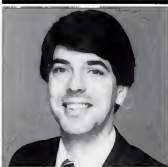
What I'm still trying to sort out, though, is who bought them. All the kids I know still want a Commodore 64 but will grudgingly take an Apple II; their yuppie mommies and daddies remain encumbered with that mysterious malady known as Mac fever. The Macintosh doesn't even compete with the PCjr at its (inflated yet profitable) price. We're talking \$1,000 machines here.

Simplicity

The simplicity crowd went for the Apple IIc. They bought them at department stores in sealed boxes, just like last year's microwave oven or next year's component TV. What are they doing with them? Playing games, feeling smug, and doing light word processing.

The IIe, meanwhile, sold more strongly in computer stores and was bought by a more sophisticated audience. The merits of an expansion bus are obvious, so the IIe is ideally positioned to catch the upscale overflow of the IIc. To the people who want to add CP/M cards, hard

disks, and so forth, the extra cost is worth it. Besides, it's just like the ones the kids are using in school, so it has a built-in acceptance factor. But even with the IIe, the retailers used to sell about 1.8 disk



Bill Machrone

drives per machine. (Remember, this relic doesn't come with disk drives. Apple II forever.) Now, the disk drive purchase rate is 1 to 1. The new crop of users doesn't see the need for two drives. If an IBM PC customer asked for a one-drive machine, the dealer would assume that he or she was getting the second drive or a hard disk by mail order.

Not so with PCjr customers. Like their Apple-buying brethren, they appear to be utterly content with one drive and a minimal amount of memory. They walked

out of the stores with the machine and the software that came with it, nothing more. Okay, maybe a few of them picked up a game or two for stocking stuffers, but software was not high on the list.

A small, but significant, segment of the PCjr-buying public was the professionals who use a PC at work. They have been waiting for the right price to get one for the home. These proficient users of personal computers are "recommenders," people who can influence the purchases of a dozen or more other buyers. So when they decide to buy, everybody buys. One West Coast retail chain had literally hundreds of PCjrs priced at \$800 on its shelves, gathering dust. It reduced the price to \$749 and sold out in 2 days.

There's no telling how big the Christmas PCjr boom could have been. If anything, it was limited by IBM's inability to fill the pipeline. Many retailers sold out their inventories and began telling consumers that they had no more machines, only to have hundreds arrive just days after Christmas. Dealers are cautiously optimistic about moving these machines during the spring. IBM helped keep the ball rolling by extending its Christmas pricing through January.

Razor Blades

It's inevitable that the surge in hardware sales will lift the PCjr software

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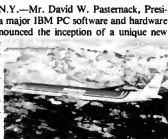
New customer service policy expected to set a new standard in the mail order industry!

BY MICHAEL CHRISTOPHER

GARDEN CITY, N.Y.—Mr. David W. Pasternack, President of Logisoft, a major IBM PC software and hardware distributor, has announced the inception of a unique new customer service policy... free overnight courier delivery on their entire product line.

In a recent interview, Mr. Pasternack stated that "We feel our new free overnight delivery service will set a new standard in the computer software mail order industry. In a study we conducted, we found that in addition to competitive pricing, experience was a factor utmost in our customer's minds. Whether their order was \$300 or \$3000, the need to get their package as soon as possible was the same. Under our old procedures, between processing and shipping time, it could take up to a week and a half to two weeks for an order to arrive. With our new courier service, an order can be processed, shipped, and arrive in our customer's hands in only 3 working days... at no additional charge!"

The company is using Emery Worldwide to handle the large number of packages being shipped each evening for next day delivery. "We chose Emery for their competitive pricing structure and excellent delivery record", said Mr. Pasternack. Emery was quoted as saying, "This makes Logisoft the largest single Emery account in the New York Metro area."



LOGICIF OF THE MONTH

Choosing software can be mind-boggling. With the proliferation of publishers, how do you choose. Analyze your needs... what specific tasks do you want to perform. Read the software reviews; an excellent way to evaluate a package. Ask around... you'd be surprised how many associates may be using a package similar to your application. Finally, choose the best package (not always the most expensive). Upgrading will end up costing you more. Remember the key word is research.

TOLL-FREE SUPPORT A Smashing Success

GARDEN CITY, N.Y.—A survey of Logisoft's toll-free technical support policy was done to see if it warranted the continued costs of the 800 toll-free number, personnel costs, etc. After careful monitoring of these calls (both pre-sale and after sale) it was found that 92% of the calls were for legitimate technical support questions rather than for answers already contained in the software's operations manual. As a result of the survey, the decision has been made to continue toll-free support as an important part of their customer service.

This service consists of assisting with: • Hardware requirements • Initial boot-up procedures • Initial software configuration (printers, disc drive, etc.) • Back-up procedures • Defective program determination • Alternative program recommendation • Return policy

Logisoft's Lowest Price Guarantee Still Effective

GARDEN CITY, N.Y.—Logisoft, Inc. has indicated that their long time policy of guaranteeing the lowest prices in the mail order market is still being offered and will not be affected by their new free overnight delivery service. "We will continue to beat any price by \$10" a company spokesman said. "We'd be crazy to fool with success", he stated; "since the inception of our lowest price guarantee, sales have skyrocketed."

When asked how Logisoft could afford to give their customers free overnight delivery plus beat any price by \$10, they replied "Buying Power". "Very simply", they said, we buy at the best possible prices and pass those savings along to our customers."

CONTINUOUS STATIONERY: BIG BUSINESS, But "Where's The Class?"

NEW YORK—The growth of Logicforms, Inc., a member of the Logic Group, has been phenomenal. Mr. Ralph Corso, President of Logicforms explains why. "Up until now, buying continuous stationery through the mail has been a take what's available situation". "First off", he said, "almost all mail order firms offer only stock letterheads & envelopes with limited typesets, colors and stock logos from which to choose, but, 'where's the class?'"

"The individual style and design of a letterhead", said Mr. Corso, "reflects the professionalism and personality of a company and should not have to change because they now have a printer and the need for continuous stationery. While other mail order firms are limited in the variety they can offer, Logicforms specializes in custom stationery. Logicforms offers a large selection of quality paper, ink colors and special effects such as thermography, blind embossing, foil stamping and multi-color printing." Mr. Corso went on to say that

"whether a customer chooses to supply his own artwork or printed letterhead, or wishes to select from our vast array of stock designs... We are the Logical Choice".

For a free sample/pricing kit and a handy re-usable shipping envelope for artwork, simply call toll-free 1-800-645-3491 or send a sample of your current stationery for a free firm price quote. Mail to Logicforms, Inc., 300 Garden City Plaza, Garden City, N.Y. 11530

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CIRCLE 101 ON READER SERVICE CARD

EDITOR'S SCREEN

market. It'll also influence the memory and add-on market as new owners explore and reach the limits of their new machines. The Sierras and Tecmars of

this world couldn't be happier. Software for this new crop of PCjr's is a shoo-in; low-end software is really a consumable item—not by the machine, but by the

customer's brain. Memory sidecars will interest fewer owners, as many will regard the standard 128K RAM as a barrier of sorts, one that is too expensive to transcend.

One final fuel source for PCjr's flame is Lotus's 1-2-3 cartridge set. 1-2-3 has sold more color displays and additional memory than all the salespeople combined. Now, it has the chance to work the same magic on PCjr. Cartridges are still the ace up PCjr's sleeve. They present no appreciable copy problem, loading delays are nonexistent, and the single disk drive ceases to be a limitation.

Professional PCjr

Committed as *PC Magazine* is to covering the business and professional uses of PCs, I keep wondering what all these new PCjr's are doing to keep busy. Did you buy one recently? What are you doing with it? Drop me a line—I'd really like to know. And while you're at it, take a moment to characterize yourself and the others who use the machine.

Most of the retailers I've spoken with say the new crop of users is uninterested in the machine's internals, utilities, or assembly language programming. Is that true? Will it stay true? Or will the machine gently snare the adventuresome and the curious?

I'd like to know the answers to these questions for several reasons. If PCjr is just another consumer product, one that doesn't involve its users emotionally, there isn't much point in writing articles about it—there are no microwave oven magazines. Also, how many people bought a pig in a poke? A certain percentage of the machines are undoubtedly destined for ignominious interment in the hall closet, under the Trivial Pursuit and Scrabble games. Of all the possibilities, this is the worst because of the obvious waste it entails.

So how about it—is the PCjr a toaster oven, last year's cocktail chatter, or a member of the family? There's a whole industry waiting for your answer. ■



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Advanced Technology. With it, IBM tripled the speed of the PC and increased its memory capacity five-fold. Now, you can harness the power of the AT with MultiLink Advanced™... a unique multi-tasking, multi-user networking system that runs programs under PC-DOS 3.0.

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STATE OF THE ART.



These are some of the most popular PC display adapter cards in the world. But few shoppers realize the many capabilities each board offers. Or how they interact with other system components. Or which might best suit their needs. In the same light, very few "discount houses" take the time and effort to test and evaluate these products. So they probably can't offer enough informative advice to assist you in choosing the best product value for your PC.

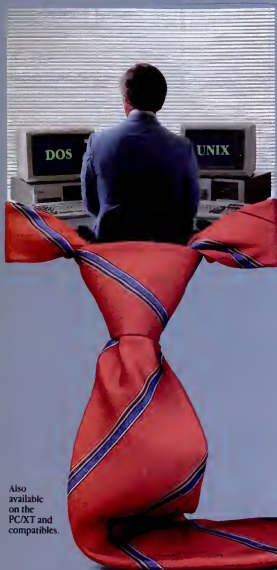
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CIRCLE 541 ON READER SERVICE CARD

NEW

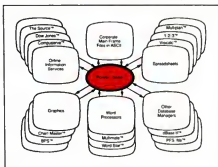
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Integration is a new, powerful concept. The new Power-base™ lets you integrate your data with much more power than single-product, integrated packages like Symphony™ and Framework™.

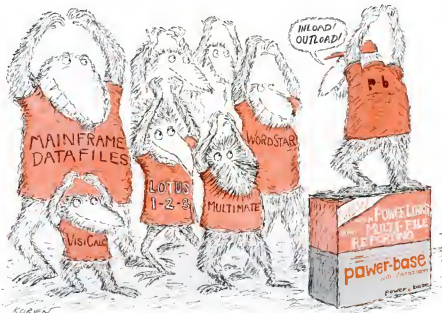
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Runs on the IBM PC, PC/XT, PC/AT, and compatibles. Requires 250K with DOS 2.0, 2.1; requires 320K with DOS 3.0
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CIRCLE 142 ON READER SERVICE CARD

Live a little. Learn

SOFTWARE

Aptec (for color Prism Printers)	
Rainbow Writer Color Text Formatter	\$119
Rainbow Writer Screen Grabber	69
Ashton-Tate	
dBase II	255
dBase III	355
Framework	355
Best Programs	
Personal Finance Program	65
PC/Professional Finance Program II	special
PC/Fixed Asset System (version 3.0)	329
PC/Tax Cut	special
Personnel (Level 1)	279
Personnel (Level 2)	419
Personnel (Level 3)	559
Bible Research	
THE WORD (KJV Bible - 7 disks)	145.
Borland International	
Sidekick	30
Sidekick (non-protected)	49
Turbo Pascal	30
Turbo 8087	59
Turbo Toolbox	30
Turbo Tutor	19
Pascal, Toolbox, & Tutor	59
Turbo 8087, Toolbox, & Tutor	85
Financier	
Financier II	115
Funk Software	
Sideways	45
Harvard Software	
Harvard Project Manager	209
Harvard Total Project Manager	279
Lifetree	
Volkswriter Deluxe (with TextMerge)	159
Volkswriter Scientific	289
Living Videotext	
ThinkTank	109
Lotus Development	
1-2-3 (version 1A)	call
Symphony	call
Micro Education (MECA)	
Managing Your Money	119
Running Program (Jim Fox)	49
Micropro	
WordStar	179
WordStar 2000	259
WordStar 2000 Plus	299
Micromin	
R-base 4000	259
Extended Report Writer	85
Clout II	135
Microsoft	
Multplan (version 1.2)	125
Microsoft Word (version 1.15)	239
Microsoft Word with mouse (version 1.15)	289
Microsoft Project	155
Microsoft Chart	155
Microstuf	
Crosstalk XVI	99
MultiMate International	
MultiMate (version 3.3)	259.
PCSoftware	
PCcrayon II	39
Executive Picture Show	139
CREATBASE	47.

PC Connection Software Special

through March 31, 1985

BEST PROGRAMS

PC/Tax Cut

- Actually two programs in one includes a tax preparation program as well as a tax planning program
- Program produces fully filled-out returns, ready to sign and file
- Includes extensive tax-help manual
- On-screen menus and prompts enhance ease of use
- Computes tax implications of various financial alternatives
- Program works alone or in conjunction with PC/PFP II (data is transferred directly between programs — no rekeyboarding necessary) \$123.

PC Professional Finance Program (PFP II)

- Program is a powerful record-keeping and accounting system
- Capable of generating budget forecasts, producing sophisticated reports and, of course, writing your checks and balancing your "checkbook"
- Characteristic of Best Programs, PFP II is easy to use, with features such as 16 transactions can be displayed on the screen at one time, "authenticity" feature which runs repetitive transactions with keystroke, checkbook-style data entry, on-screen calculator, and built-in running total function 143

PC/Tax Cut and PFP II

\$259

Peter Norton

Norton Utilities (version 3.0) \$65

Rossoft

Prokey 3.0 89

Software Publishing

PFS Access 59

PFS File 85

PFS Graph 85

PFS Plan 85

PFS Proof 59

PFS Report 77

PFS Write 85

Warner Software

The Desk Organizer 139

TRAINING

ATI

SKILL BUILDER PROGRAMS

Intro To

Word Processing Accounting

Business Software Data Bases

..... each 32

How to Use:

Compaq PC-DOS (2.1)

Basic Home Accountant

IBM-PC VW Deluxe

MS-DOS (2.0) TKISolver

..... each 32

TRAINING POWER PROGRAMS

How to Use:

dBase II	dBase III	Lotus 1-2-3
MS Word	Easywriter II	Multimate
Multplan	Supercalc 3	Framework
Symphony	Wordstar	
		each 49

Comprehensive Software

Intro to Personal Computing	39
Intro to Databases	39
Intro to Communications	39
Intro to the Operating System (PC Tutor)	39

Individual Software

The Instructor	35
Professor DOS	47
Tutorial Set (both items above)	75
Professor Pixel	47
Typing Instructor	39

Scarborough Systems

Master Type	35.
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EDUCATIONAL

Davidson

Speed Reader II (high school & college)	49
Math Blaster (grades 1-6)	35
Word Attack (grades 4-12)	35
Spell It (grades 5-adult)	35

Digital Research

Diagnostic Test (PSAT)	14
OnCat SAT (15 hours)	63.
OnCat SAT (60 hours)	169

Stone (requires graphics board)

My Letters, Numbers, Words (ages 1-5)	29
Kids Stuff (ages 3 to 8)	29.
Across the U.S.A. (ages 5 and up)	22

GAMES

Blue Chip

Millionaire	39
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Broderbund

Lode Runner	25
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Hayden Software

Sargon III	35.
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Microsoft

Flight Simulator	35.
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Origin Systems

Ultima III	39.
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Orion

J-Bird (you'll never sleep)	29.
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PCSoftware

Championship Blackjack	23.
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Sir-Tech

Wizardry	42
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Spectrum Holobyte

GATO	27.
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Sublogic

Night Mission Pinball	29
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HARDWARE

AST Research (For IBM-PC or XT)

All AST Boards come with SuperDrive, SuperSpool, and one year warranty.

SixPakPlus 64k upgradeable to 384k, with clock calendar, serial and parallel ports (game port optional) 249.

MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional) 249

n a little. Save a lot.

MegaPak 128k (not upgradeable)	\$239
MegaPak 256k	339
I/O Plus II with clock calendar and serial port (parallel, game, or second serial port optional)	129.
Parallel, game, or second Serial Port for any AST board (specify board)	35.
AST-5251	529
AST-3740	589.

Amdek	
Video 300G monitor (green)	139.
Video 300A monitor (amber)	149.
Video 310A monitor (amber)	179.

Compucable	
Plastic Keyboard & Drive Cover Set	17
IBM Mono Screen Enhancement	17.

Cuesta Systems	
Datasaver (200w power back up)	call

Curtis STANDS	
PC Pedestal (for IBM Mono or Color)	37
PGS or Quadchrome Adapter for above	9
Low Profile Tilt and Swivel Pedestal	37
Ad-2 Adapter for Portables	15
System Stand	19

CABLES	
Extension Cables for IBM Mono Display	35
Keyboard Extension Cable (3 to 9 feet)	27.
AC Plug Adapter (any monitor to your PC)	8.

SURGE SUPPRESSORS	
Diamond (switched 6 outlets)	33
Emerald (switched 6 outlets; 6 ft cord)	43
Sapphire (switched 3 outlets; EMI/RFI filter)	53
Ruby (switched 6 outlets; EMI/RFI filter; 6 ft cord)	63.

Epson	
Many of the RX, FX, and JX dot matrix printers are now being shipped as the "Plus" version. "Plus" printers can print in near letter quality (NLQ) with the addition of the NLQ option.	
RX-80 with GRAFTRAX-Plus	call
FX-80 with GRAFTRAX-Plus	call
RX-100 with GRAFTRAX-Plus	call
FX-100 with GRAFTRAX-Plus	call
JX-80 with GRAFTRAX-Plus	call
LQ-1500 (letter quality dot matrix)	call
Printer to IBM Cable (specify printer)	27.

Hayes	
Smartmodem 300	199
Smartmodem 1200	459.
Smartmodem 1200B (w/Smartcom II)	389
Smartmodem 2400	597
Smartcom II	89

Hercules Computer	
Hercules Graphics Card (parallel port)	309
Hercules Color Card (parallel port)	169.

IOmega	
Bernoulli Box 20 Meg	2695
10 Meg cartridge	56

key tronic	
Deluxe keyboard (KB 5151)	169

Koala	
Koala Touch Tablet with software	89

PC Connection Hardware Special through March 31, 1985

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TM 100-2 Disk Drive (DS/DD)

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Continental US: For monitors, printers, and drives, add 2% to all orders. For all other items, add \$2 per order for UPS surface, \$3 per order for UPS 2nd-Day-Air. We particularly recommend 2nd-Day-Air if you live west of the Mississippi or south of Virginia. In most cases it will only cost \$1 more and will save you up to four days on delivery time. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$3 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information.

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Kraft	
Joystick	35

Maynard Electronics	
Floppy Drive Controller	119

Internal Hard Disk (10 Meg) with WS-1 Controller	859
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Internal Hard Disk (10 Meg) with WS-2 Controller	1049
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Mouse Systems	
PC Mouse (w/software, pad, & PC Paint)	139

PC Paint (software)	69
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NEC	
Spinwriter 2050 (3550's little brother)	699

Spinwriter 3550 (IBM-PC compatible)	1369
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Spinwriter 8550 (IBM-PC compatible)	1789
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Orchid Technologies	
All Orchid Boards come with PCnet Drive (Ram disk) PCnet spool (print spooling), disk caching & partitioning	

Blossom 64k upgradeable to 384k, with clock calendar, serial and parallel ports	229
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PCnet Daughter Board (piggybacks to Blossom) with version 2.4 networking software	call
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Paradise Systems	
Modular Graphics Card	275

Multidisplay Card	289
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Princeton Graphics	
Hx-12 RGB monitor (690 x 240)	call

MAX-12 Amber monochrome monitor	call
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Quadram	
New Expanded Quadboard 64k expandable to 384k, with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software	249

MicroLazer Printer Buffer (parallel) w/copy MP 64 (64k) upgradeable to 512k	169
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Quadcolor	197.
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SMA (Systems Management)	
PC-Document Keyboard Templates available for:	

DOS/Basic 1.1	Supercalc 3
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DOS/Basic 2.0-2.1	Wordstar
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Lotus 1-2-3	Turbo Pascal
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Symphony	WordPerfect
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Multiplan (IBM)	dBase II
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Multiplan (Microsoft)	dBase III
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Peachtree 5000	Framework
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Easywriter II	Multimate
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Volkswriter Deluxe	each 12.
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DRIVES	
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All drives are completely pre-tested and are supplied with a printout of the test results. Comes with complete step by step installation instructions. Drives are 320k/360k.

Tandon	
TM 100-2 (5 1/4") full-height drive (DS,DD)	see special

TEAC	
FD-55B (5 1/4") half-height drive (DS,DD)	119.

Free "y" cable & bracket with each pair.	
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CIRCLE 339 ON READER SERVICE CARD	
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PC CONNECTION®

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Alpha Software

ESP.....	\$529
Electric Desk (PC).....	\$209
Electric Desk (jr).....	199
Arrows Inc.	
Home Acc't + w/.....	\$ 90
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Tax Advntg.....	\$139

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All Training Prog's. ea.....	\$ 49
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B&L

Multi-job.....	\$145
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BPI

Personal Acc'g.....	\$ 69
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Borland

Side Kick.....	\$ 37
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Code

Turbo Pascal.....	\$ 37
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Cadex

All Training Prog's. ea.....	\$ 49
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Central Point

Copy II PC.....	\$ 34
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CompuView... See Special

Connecticut Software

Printer Boss.....	\$ 79
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Above w/ Side Kick.....	119
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Decision Resources

Chart-Master.....	\$255
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Sign-Master.....	195
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Grammatik.....	\$ 60
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Proofreader.....	42
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Digital Research

Avail in CP/M or PC-DOS.....	
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Fortran 77.....	\$299
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Pascal M1+.....	Call
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Display Mgr.....	299
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Access Mgr.....	249
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DR Assem. & Tools.....	129
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DR Graph.....	119
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Concurrent.....	Call
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Avail CP/M only:

C Basic-86 Interp.....	119
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CP/M-86.....	49
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Personal Basic.....	99
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Daw Jones

Spreadsheet Link.....	\$179
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Home Budget.....	89
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EcoSoft, Inc.

Microstat.....	\$239
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Emerging Technology

Edix (editor).....	\$139
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Wordix (formatter).....	139
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Prof Writers Pkg.....	389
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Enertronics

Energaphica.....	\$219
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w/ Plotter Option.....	279
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dBASE CORNER

Anderson-Bell

Abstar.....	\$289
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Ashton-Tate

d-Base II.....	Call
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d-Base III.....	Call
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Framework.....	Call
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Friday.....	Call
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Fox & Geller

dGraph.....	\$159
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Quick Code.....	159
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Quick Report.....	159
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dUnit.....	58
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Human Soft

db Plus.....	\$ 85
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(All above available on PC-DOS.)

Fastware

Thor.....	\$245
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Financier, Inc.

Financier II.....	\$119
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Tax Series.....	105
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Fox & Geller

Grafax.....	\$159
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R-Graph (for R-base 4000).....	\$159
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FYI

Supertile.....	\$139
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FYI 3000.....	259
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Harvard Associates

PC Logo.....	\$ 99
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Harvard Software

Project Manager.....	\$249
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Smartcom II.....	\$ 95
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Flexin.....	Call
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Smartkey II+ (w/Print).....	\$ 75
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Authoring Graphics.....	\$299
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Prof. DOS.....	\$ 47
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Think Tank (256K).....	\$119
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MOBS, Inc.

Knowledge Man.....	\$275
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K Test.....	109
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K Point.....	65
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Merlo Corp.

In-Search.....	\$279
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W5 ProPak (WS, CS, MS, SI).....	\$275
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WordStar.....	175
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WordStar 2000.....	289
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Wordstar 2000+.....	349
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Pro Options Pak.....	109
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R-Base.....	\$265
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R-Base Clout (2.0).....	139
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Report Writer.....	95
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Microsoft

Chart.....	\$159
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MultiMath/MSDOS (DOS).....	179
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Pascal Comp (DOS).....	199
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Project.....	169
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C Comp (MS DOS).....	319
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Basic Comp (MS DOS).....	249
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Multiplan 1.20.....	
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MS/DOS.....	\$129
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Word 1.15 (DOS).....	229
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Word w/ Mouse.....	299
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Others.....	Call
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Microsoft

Crash!.....	\$ 99
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Remote.....	Call
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Morgan Computing

Professional Basic.....	\$ 79
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Trace 86.....	99
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LOTUS 1-2-3 CORNER

Programs for your LOTUS 1-2-3

Consumer Software, Inc.

"Auditor" (proof-reading tool).....	\$ 85
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Lighthouse Software

Key II (Data Mgmt for 1-2-3).....	\$149
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National Training Systems, Inc.

Putting 1-2-3 to Work (8 application templates on diskette).....	\$ 79
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Phase Two Software

The Tool Kit (30 worksheet files).....	\$ 30
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Strategic Software Systems, Inc.

Bottomline V.....	\$195
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Multimate Systems Inc.

Multimate (Vers 3.3).....	\$289
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North American

Memory Shift.....	\$ 79
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Northwest Analytical

Statpak.....	\$365
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Oasis

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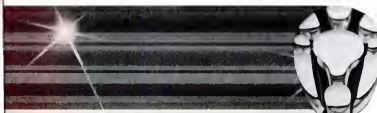
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Letters to PC

Getting Rid of .BAK Files

George Beinhorn's articles about WordStar have been welcome and very helpful. However, at the end of his article "Making WordStar Uncommonly Good" (Volume 3 Number 18), he promised that the next article would tell us how to put one over on the .BAK file function. I was so anxious to solve this problem that I rushed out to the newsstand to read the article before I received my subscription copy, only to learn that there was no mention of the .BAK file in the follow-up article ("Getting the Most Out of WordStar," PC, Volume 3 Number 19). Therefore, I am seeking a solution to my problem.

As any WordStar user knows, the program creates a backup file (FILENAME.BAK) whenever a file is edited and saves both the original file and the backup file when you want to save your original file. On both the IBM PC and XT, if there is not enough room on the disk, you have to edit without saving, which can result in the loss of your edited text. On the XT, I realized that before I enter the disk mode I can delete unused files and all the extra .BAK copies that have accumulated. Can I overcome this problem on floppies or must all my file sizes be greater than or equal to one-half the disk storage of a floppy (180,000 bytes for PC-DOS 2.0)?

Alice L. Ullrich
Kalamazoo, Michigan

George Beinhorn replies:

The suggestion that I made about circumventing .BAK files was to give all working files the same name (for example, Product.txt, Product.let, or Product.doc) so that just one .BAK file would be created for all of them.

As far as I know, its not possible to

patch WordStar to turn off the .BAK file function. Even if you were to stop the creation of a certain .BAK file, WordStar would still need the equivalent disk space in order to write the most recent version of your file.

One reasonably helpful method of telling WordStar to write the current version to a floppy disk in an alternate drive is described in the manual for Version 3.3 on pages 1-13.

Organizing with SideKick

In reference to the review of desk organizers ("Organize Your Desk and Your PC," Volume 4 Number 2), there are several points that I would like to clarify regarding SideKick.

The "chirp" feature in SideKick simply informs the user that DOS is currently in an uninterruptible state. Usually this means you are in the middle of typing a command. Printer errors can also cause this condition. Pressing the Enter key usually clears it.

The current version (1.11C) of SideKick works with XyWrite II and other programs that "steal" the keyboard interrupt—by stealing it back! Also, I'm happy to report that the slowdown problem with PRINT.COM was fixed several versions ago.

Finally, we feel strongly that we are the only vendor of desk organizers that offers the consumer a choice in copy protection. Borland International stands by its commitment to the best product at the best price, and your readers' acceptance of SideKick shows that we must be on the right track. Thank you for an otherwise fine review.

Philippe Kahn
President
Borland International
Scotts Valley, California

Aligning Top of Form

I must say that I was a little disappointed after reading your generally informative issue on IBM-compatible printers (PC, Volume 3 Number 23).

There is a basic problem with all printers that your reviewers seem to have overlooked. They may have passed over it because they are inured to the shortcoming or because they have never experienced it. However, since it is a problem that rears its head the first time you ever use a printer, I must assume that their reason is the former.

What is this horror? It is the problem of aligning the top of the paper with the printhead so that you really know where the top of the form is with respect to the first line of print. This is not a serious problem if all you are doing is letters, but if you've ever had to run labels or forms on a long run, then you know it is a real pain in the neck as well as a potential waste of time and paper.

I don't know why manufacturers can-



not install a simple sensing mechanism to allow the user to make that alignment easily, instead of giving vague instructions about the "top of the ribbon" and the like. I can think of several reasonable, inexpensive ways to accomplish the desired results.

I'd also like to make some additional comments. Many printers, both dot ma-

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LETTERS TO PC

trix and letter quality, allow the user to feed single sheets. These same printers also have a "paper-out" sensing mechanism that is placed so that when you use single sheets, it allows only about two-thirds of a sheet to be printed out before it stops printing. The usual method of determining the paper-out point is with a pressure-sensitive switch; this can easily be disabled by tacking it down with Scotch tape, but there is some inconsistency here. The first time I met with this problem was with a Radio Shack printer for my old TRS 80, and Radio Shack was completely uninterested in the problem.

Another feature that printer users must be careful of is the use of attached envelopes on pin-feed forms with printers that have a movable head. Disaster will occur after a few printings.

Finally, an observation on my own printer. I have an Epson MX 100 that has been in continual use for over 2 years. I have gone through a number of ribbon changes, and it has never let me down. It is reliable and flexible.

Morton F. Kaplan
Pomona, New York

Corrections:

The correct telephone number for The National Computer Training Institute (NCTI) is (800) 425-NCT1 ("IBM Grants Aid for Computer Literacy," PC News, Volume 4 Number 1, page 33).

In PC News, Neal Larson, president of MaxThink, was incorrectly identified as the president of Living Videotext ("Thinking About Idea Processors," PC, Volume 4 Number 2, Page 55). Living Videotext produces *ThinkTank*, which was identified as "one of the first" idea processors in that same article. A spokesperson for Living Videotext said that *ThinkTank* was, in fact, the first such program, and that the "negative" comments attributed to Larson reflected badly on the company. PC Magazine regrets the error.

(continued)

LETTERS TO PC

Production slips resulted in the omission of one line and the wrong positioning of six lines in the assembler listing for Steven Holzner's "PC Notepad Made Easy" (*PC*, Volume 3 Number 25).

The following corrections should be made:

1. In Figure 2 (p. 278), between

```
MOV BX, OFFSET BUFFER_END
and
```

```
NO_WRAP: MOV DX, [BX]
```

insert the *additional* line:

```
SUB BX, 2
```

(That same line should also remain where it already appears, three lines above.)

2. The first six lines on p. 279, beginning with

```
CALL DISPLAY
```

down to and including:

```
MOV BX, PAD_CURSOR
```

should be moved as a block back to p. 278—specifically, under the DEL_LOOP: label. They should be inserted between

```
MOV PAD_CURSOR, 0
```

and

```
CMP BX, 0
```

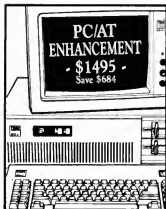
In David Hunter's "PARINT.COM" program ("Parity Insurance," *PC*, Volume 4 Number 2), a similar "paste-up" error resulted in the misplacing of a block of assembler code. The entire section on p. 313 from

```
; _____DATA_____
GetOut: nop
```

down to and including:

```
paroff db "PARITY
CHECKING...."
```

```
; _____MAIN PROGRAM_____
```



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LETTERS TO PC

should be moved from the bottom of p. 313 to the very top of p. 312, just before the instruction

go: push cx

Readers should also note that the code for this program was designed for the IBM 1.0 Macro Assembler, and that some changes may be necessary to assemble it with Version 2.0.

There were no errors in the BASIC listing either for NPAD.COM or for PARINT.COM

The last sentence of "Remote Access with CTTY" was cut off (PC, Volume 4 Number 3, page 339). It should read as follows: "Contact your local users group or check the IBM PC SIG on CompuServe."

In "LAN Speed Trials" (Volume 4, Number 3), the numbers in the box on page 168, "How Do the Networks Stack Up Against a PC?" should be:

Development	307 Seconds
Productivity	103 Seconds
LAN: Datastore	73 Seconds

The times graphed on page 170 of the same article and printed in the boxes titled "Throughput Times" in the individual network reviews are the averages of the times for the one-, two-, and four-user runs.

For Quadnet IX, the development time in the chart on page 170 and in the throughput box on page 245 should be 362 seconds.

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Across-the-Board Surprises

IBM's promising Enhanced Graphics Adapter turns out to be a disappointment, but AST's multifunction Advantage board offers both help and hope to AT aficionados.

If it weren't too corny, I'd call this a tale of two boards. I've been playing with a couple of new expansion boards for the PC series: IBM's razzle-dazzle Enhanced Graphics Adapter, or EGA, board and AST's melodramatically named Advantage multifunction board for the AT. IBM's board has been getting lots of applause, but I found it rather disappointing. The AST board sounded ho-hum—useful but dull—yet I found it worth cheering about.

The Historical View

Nobody who knows the potential of computer display screens was thrilled with either IBM's monochrome adapter or its color/graphics adapter. The monochrome—which I happily use 98 percent of the time—produces clear characters in a nicely designed type style with decent, but hardly state-of-the-art, resolution. But there are no graphics, no color, and no flexibility. The color/graphics adapter, on the contrary, is flexible, offering color, graphics, italics, and such. But its resolution is poor, its color limited, and its native characters crummy at best. Working all day in front of a color monitor hooked up to the IBM color/graphics adapter is mostly for masochists.

The folks at Hercules solved some of these problems with the "Herc card," an alternative to the IBM monochrome

adapter. The Herc card drives a monochrome monitor like an IBM monochrome adapter does, but Herc adds good-quality monochrome graphics and worthwhile extended text formats. The



Peter Norton

other half of the Herc miracle is that all the really important software packages—1-2-3, Microsoft's *Word*, and *Framework*—come with Hercules drivers to make that display board sing and dance. If you've ever seen Microsoft's *Word* running on a Herc card, you know the joy of watching a well-tuned hardware/software combo in action.

IBM's EGA

Although I'm not a fan of color, I know that the monochrome Herc card

can't possibly be the final solution. IBM's EGA, however, looked like the last word in display adapters for the PC family. The EGA's potential is nothing short of amazing. It can substitute for either a monochrome or a color graphics adapter, doing the full work of each, and, like the PCjr, it works without creating the color graphics adapter's screen snowstorm. Furthermore, it does Herc-style monochrome graphics and extended color graphics even better than the PCjr's. And the two jacks in the back marked "Reserved" could be signs of interesting things to come. Best of all, coupling the EGA board with IBM's new enhanced color display gives you color text so sharp and clear that even demanding PC staffers swear you can work with it all day without eyestrain.

The complete kit consists of the EGA board itself, the graphics memory expansion card that plugs into it, and the extra memory kit to fill the memory expansion.

Color Me Disappointed

My first disappointment was quality. I bought two complete sets. One EGA memory expansion card was defective enough to keep the computer from booting when it was plugged in, and one of the EGA boards put out a distorted display of text characters (although the

NORTON CHRONICLES

graphics mode worked fine). That's two out of four parts dead or defective: Not a promising beginning.

The biggest disappointment, though,

was with what the EGA could do right out of the box. Perhaps I was being naive, but I really expected it to be able to perform some of it's magic without cus-

tom-adapted software. After all, if the thing is designed to do monochrome graphics on a IBM monochrome adapter, I expected IBM's BASIC or the DOS MODE command to be able to put it into graphics mode so that existing software could take advantage of it. No such luck. Maybe I'm just dumb, but I couldn't get any of the magic to work.

The EGA board may represent the wave of the future for PC display adapters, but for now, you're better off with a Herc card. Until the arrival of spiffy new software designed to drive the EGA board to its full capability, it doesn't offer many thrills.

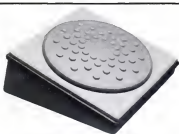
Here's a tip, though, if you do buy an EGA board. If you also get the graphics memory expansion add-on card, you can save some money by taking a pass on the standard memory module kit. It's just memory chips—no other hardware. If you want to save money, buy the chips separately.

The AST Advantage

AST's Advantage multifunction board for the AT restored my good spirits. Although I've never been a big fan of AST, the well-thought-out and well-engineered Advantage board changed my mind.

A case in point—its memory. The AT's natural complement of memory is 256K or 512K (128K short of the PC-family's natural maximum of 640K). As IBM laid things out, each of three possible memory expansions (from 256K to 512K, from 512K to 640K, and special high-memory additions for use as a RAMdisk in DOS or as program memory in XENIX) is a separate and unnecessarily expensive purchase. In addition, the 128K add-on, which brings the AT up to 640K from 512K, has been rather hard to come by recently.

If you don't use memory-hungry programs, the difference between 512K or 640K may not seem important, but with power-programs such as *1-2-3* and *Framework*, the difference can be criti-



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cal. Certain financial institutions have bought PC ATs to speed up spreadsheet calculations, only to discover that spreadsheets that ran slowly on a 640K XT wouldn't fit into the faster but smaller 512K AT.

Advantage to the rescue. As AST designed it, the Advantage board's memory can be placed anywhere, which means that part of it can bridge the 512K-640K gap, while the rest of it can go up into extended high memory. I'd like to see more of this kind of flexibility in add-on boards.

Beside the memory, Advantage adds more serial, parallel, and game ports than a Swiss Army knife has blades; if you need them, it's nice to know that they are there. Even better, AST has designed them to be used neatly and easily when you need them and to stay out of the way when you don't.

An AT in Need

If you're singing the blues because the Blue Meanies have made it nearly impossible for you to buy an AT, the Advantage may offer a solution. The more-or-less standard fully loaded AT—the enhanced model, which comes with 512K and that rumored-to-be trouble-prone 20-megabyte hard disk—is the one that's hard to get. The stripped-down model is much easier to find, and the AST Advantage board can help you upgrade to the advanced specs: it'll take the memory up to 512K, then on to 640K, then into extended memory, and it'll also replace the serial-parallel combination board that IBM sells with most ATs.

The hardest nut to crack is putting a hard disk into the AT, but it turns out it's easier to put an add-on hard disk into an AT than into a PC. The disk controller and BIOS that come with even the stripped-down AT allow you to plug in the right kind of add-on hard disk without any extra hardware or software.

I haven't tried it myself, but I understand you can get four sizes of AT-ready hard disks from Interface, Inc., at 21101

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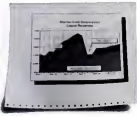
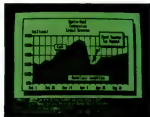


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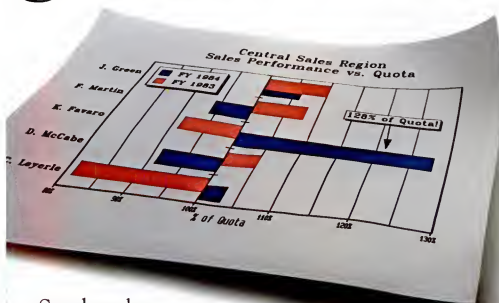
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The Express Systems™ tape drive comes complete—half-high tape drive, controller, and software—for only \$995. It's absolutely IBM compatible—all 60 megabytes of it.

You can use your tape drive in the event your hard disk fails. And if you have to replace your hard disk, the tape's ability to read bad sectors will let you replace your hard disk with another even if the new one is not error-free. The tape requires very low power, too.

And it doesn't poke along. It reads and writes at 90 inches per second (ips) and transfers data at up to 3.75 megabytes per minute in the streaming mode. You don't have to be a rocket scientist to figure that you can perform an image backup of a 20 megabyte hard disk in about 5 minutes. But practically speaking, once you back up your hard disk completely for the first time, you never need to do more than invoke the archive command—that convenient command that tells your new tape drive to back up everything since you last backed up. If you back up as often as you should, your Express Systems tape drive will finish the job virtually in seconds.

The Express Systems software has additional benefits, like enabling you to use PC DOS terminology such as "..." and "..." and "..." It also has a built-in reformatter, built-in verification (to make sure you transferred what you thought you did), and it's prompt driven, which means it asks you exactly what you want to do.

Easy to install

Before you get intimidated about installing our tape drive internally, you should understand that IBM doesn't think it's too difficult. They're selling IBM PC ATs with instructions on how to add additional hard disks in the *Installation and Setup* manual that comes with the AT.



The IBM AT installation manual shows how easily you can install internal storage drives yourself.

Our instructions for installing your new Express Systems tape drive follow IBM's clear, simple instructions.

We even provide the tape cartridge

Most people don't realize that the tape cartridge contains most of the critical mechanisms to insure data integrity. In order to be sure that you get the best insurance for your data (after all, isn't that why you're buying it?), we encourage you to use Express Systems' specially tested tape cartridges. We're not going to kid you and tell you otherwise won't work, but here's what's special about Express Systems' tape cartridges.

First, they are tested down to four separate tracks from end-to-end, not just down the center of the first 150 feet, like some others do. We use three screws to hold the cover on instead of four. This simple triangular arrangement keeps the base-plate flat, just like three legs work better than four to make a table steady. Since all tapes drive reference everything to the base-plate, this alignment is critical. We also use special rollers to dissipate static electricity buildup—something that can ruin your whole day.

And finally, we will sell you tape cartridges in boxes of three instead of the usual five. So, you get higher quality with a smaller quantity commitment. And we compound the savings with a lower per unit price, just at \$35.00 instead of the usual \$45.00 most retailers charge.



The Express Systems tape drives come with Express Certified™ 555 or 660 1/2-inch tape cartridges with quadruple end-to-end testing for extra insurance of your data.



Need a hard disk?

Depending on whether you have an IBM PC, XT, or AT you may want additional hard disk storage. We have those too. We offer 10, 21 and 31 megabytes of formatted hard disk storage.

For the most part, our drives are made with plated media,



which means there is less chance to damage them. (Let's face it, the oxide that most disks come with is nothing more than rust.) We then test the drives, pre-format,

Express Systems offers 10, 21, and 31 megabytes of formatted storage in the half-high format so you have extra space for other storage options.

format, and install DOS 3.0 so that you're ready to begin transferring files. We even include DOS 3.0 documentation.

And they're 100 percent IBM compatible. The controller we send you for the XT is an upgraded version of the XT controller from the same company that makes the XT controller. In fact, the Express Systems controller is an improved controller which requires less power so that it is more reliable than any other standard controller.

We provide the power too.

If you want to upgrade your IBM PC, there just isn't any way around upgrading your power supply—if you want to have

true XT or better capability. Some companies say that their hard disks don't require any increase in power—and they might be right. But don't add anything to your slots, because the minute you do, you'll need more power. That's the bad news.

The good news is that our power supplies are inexpensive. At \$99.50 for an XT power supply? We mean a full 130 watts of power. The other good



Our 130 watt power will convert your PC to XT standards; and it's only \$99.50 with any tape drive or hard disk order.

news is that it's held in by only 4 screws. Express Systems' power supplies can be changed in 30 minutes, a small price in time for the peace of mind to convert your PC to an XT-capable machine and avoid the unsightly "wart-like" power supply add-ons that some companies insist you paste on the back of your PC.

But from a mail order house?

We get tired of the snide remarks some people make about mail order houses. The comments are usually spread by distributors and retailers who are getting cut out of 15 and 35 percent margins, respectively. If we went through distribution—you'd have the privilege of paying for large glass windows, rugs, salesmen, etc.—but we'd also be selling this tape drive for \$149.5.

We're not criticizing distributors and retailers. They perform a valuable service. But you don't need them if you know what you want. And you can certainly install it yourself. IBM has proved it with their instructions for self-installation that come with the new IBM PC AT.

Express Systems Upgrade Kits

(Includes controller, software, and cable where appropriate)

IBM AT (model 99) to AT ExPlus™	
1 half-high tape drive system	\$995
IBM XT to XT ExPlus	
1 half-high floppy and 1 half-high tape drive system	\$1095
IBM AT (model 68) to AT ExPlus	
21 Megabyte upgrade	\$1895
1 half-high 21 megabyte hard disk with half-high tape drive system	
31 Megabyte upgrade	\$2195
1 half-high 31 megabyte hard disk with half-high tape drive system	
IBM PC to XT ExPlus	
2 half-high floppies, 1 half-high 10 megabyte hard disk with controller, 1 half-high tape drive system and 130 watt power supply	\$2095

And speaking of IBM, the next time you hear anyone criticize mail order as a way to buy computer equipment, remind them that IBM is now in the mail order business.

Warranty

We offer you a one year warranty on our hard disks—the same as IBM on the AT and 90 days on the tape drives. (It's all the manufacturer gives us.) If anything goes wrong with your tape or disk drive or hard disk, send it back in the box it came in. However, we have found that we can usually solve the problem over the phone. So call first for a return authorization number because we can't accept any returns without it.

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21 megabyte hard disk* \$995

31 megabyte hard disk* \$1395

*Subtract \$295 for IBM AT which does not require hard disk controller

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130 Watt XT replacement Power Supply \$99.50

(Price valid only with purchase of tape drive or hard disk. Otherwise, \$149.95)

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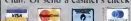
555 feet of specially sealed 300 Hci tapes

Express Certified 600™ \$35.00

600 feet of specially sealed 550 Hci tapes

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Pick up the telephone and call 1-800-341-7549, to order. We accept Master Card, VISA, American Express and Diners Club. Or send a cashier's check



or money order (We'll take a check, but you'll have to wait for it to clear) and tell us if you want one of our recommended configurations or you want to mix and match yourself. Corporations with a DUNS number may send purchase orders for quantities over five.



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CIRCLE 227 ON READER SERVICE CARD

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10. Name the companies that can provide all of the above? _____

*(Turn Page Upside Down for Answers)

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CIRCLE 161 ON READER SERVICE CARD

TACKLING THE TAX PROBLEM

SOFTWARE FOR YOUR PC



ALTHOUGH IN WASHINGTON THE CURRENT WORD ON TAXES IS *simplify*, legislation has yet to abate this year's April 15 anguish. Fulfilling your annual tax obligation to the IRS is still fraught with complex calculations, seemingly circular definitions, and mind-boggling rules. And for PC users, the wide variety of tax software makes matters even more perplexing. In this cover story *PC Magazine* collaborates with Price Waterhouse to separate the planners from the preparers and the recordkeepers from the organizers—to give you an inside look at tax packages for the PC.



Computer-aided tax planning and tax return preparation is not new—large firms have been loading tax figures onto mainframes for years—but the microcomputer and tax software are more popular than ever. They've let smaller CPA firms and individual taxpayers into the act, producing computer-generated tax returns and bringing speed and bull's-eye accuracy to tax-planning computations.

Though the talk in Washington is for tax simplification, the Internal Revenue Code and Treasury Regulations are loaded with intricacies. Taxpayers are faced with a labyrinth of strategies to get to the bottom line, and this is where tax-planning software is valuable. It can show you a wealth of alternative results and thereby give you very useful information, but it can't tell you which route to take, nor is it a substitute for the knowledge and experience of a qualified tax professional.

In addition to tax-planning guidance, tax software can help you properly file your return. Tax time is hardly pleasant, but a PC and the right software can make it less burdensome.

Four Categories

The PC software market offers dozens of tax packages; new ones are announced almost daily. Since each person's tax situation is unique, no one package can meet everyone's needs. Once you know the features and benefits the various programs offer, you should be able to choose one most appropriate for you.

In the reviews that follow, we have loosely divided tax software into four categories: tax planning, tax return preparation, tax information organization, and tax recordkeeping. We selected programs geared to the tax nonprofessional (though you must have some knowledge of tax rules) and attempted to choose a few exemplary packages from each of the four groups. Our survey is in no way comprehensive. Product information for other programs is included in the sidebar "More Taxing Choices" to give you an idea of the wide variety of tax software available.

Because so many rules come into play in tax law, it is not feasible to test the accuracy of a program in all possible situations. The comments in the reviews pertain only to the program's accuracy and performance under the conditions tested. To ensure that the reviewers had a uniform set of data and could test a variety of a program's capabilities, we devised two scenarios (see sidebar, "Two Taxing Tests") for them to work with.

As you consider purchasing a tax program, keep in mind that tax laws are changing constantly—the program you buy to prepare your 1984 tax return will probably not be usable for 1985. Most vendors offer an update service, which is an extremely important feature to look for as you make your selection.





TAX PLANNING

Tax-planning software has three major uses: it does "what if" computations on financial transactions that have tax implications; it computes tax liability before year-end, eliminating an end-of-the-year surprise, or on a quarterly basis to determine the amount of estimated tax you must pay; and it confirms amounts entered on a manually prepared return.

As noted, a very important feature of tax-planning software is that it calculates estimated tax payment amounts. The Tax Reform Act of 1984 made significant changes in the estimated tax requirements for individuals.

First, the exceptions that enabled taxpayers to avoid the underpayment penalty under current law were repealed for tax years starting with 1985. To avoid a penalty, required estimated tax payments must now equal at least one of the following amounts:

- 80 percent of the tax shown on the current year's return;
- 100 percent of the tax shown on the preceding year's return; and/or
- 80 percent of the tax on annualized income to date. If an installment is based upon this amount, the next installment (if not computed under this method) must be increased by the difference between this amount and the lesser of the other two amounts.

For example, suppose an individual incurred a \$40,000 tax liability for 1984

and expects a \$45,000 liability for 1985. For the period from January 1 to March 31, the tax on annualized income is \$37,500, and from January 1 to May 31, the tax is \$47,500. Based on this, the amounts shown in Figure 1 are the required estimated tax payments for the first and second installments of 1985 under the three methods. At April 15 at least \$7,500 must be paid, based upon annualized income. At June 15, at least \$11,500 must be paid to avoid penalty: \$18,000 (based upon 80 percent of the cumulative 1985 expected liability) minus the \$7,500 paid at April 15. Of course, if the actual 1985 tax is more than \$45,000, a penalty would result.

Second, the penalty for underpayment of estimated tax is based upon the difference between the amount paid and the required amount calculated using the above methods; this rule also takes effect for tax years beginning in 1985.

Third, for tax years beginning in 1985, the "tax" for estimated tax purposes now includes the alternative minimum tax.

Fourth, for years beginning in 1984, the IRS may waive the underpayment penalty in the event of casualty, disaster, or other unusual circumstances where it would be inequitable to impose the penalty, or if the taxpayer retired (after attaining age 62) or became disabled during the year for which the installment was to be made, or the preceding year, and the underpayment was owing to reasonable cause and not willful neglect.

We selected four tax-planning software packages to review:

Tax Decisions can handle a significant amount of detail (for example, information pertaining to individual partnerships can be entered separately). In addition, the reports resemble a tax return; in fact, this program is a hybrid of tax return preparation and tax planning.

Financier Tax Series is another comprehensive package that can integrate with the vendor's home accounting series.

BNA Income Tax Spreadsheet lives up to its name—it has a spreadsheet design, and its publisher (Bureau of National Affairs) has earned a reputation based on its experience in tax publications.

Professional Tax Planner is a comprehensive, sophisticated program. McGraw-Hill, its publisher, is also experienced in tax publishing and has demonstrated its ability to rapidly make the necessary adjustments to the program in response to on-going changes in tax law.

TAX RETURN PREPARATION

The major differences among tax return preparation programs lie in the style of data input, the method of printing the return, and the number of forms and schedules the program can prepare. (The charts accompanying the reviews compare these and other features.)

Most preparation programs use an "input sheet" approach to data entry. This approach is similar to the method accountants use when they prepare returns through a service bureau. Under this method, there is little correlation between the figures on the input sheets and the entries on the tax return; the software does the work of sorting and computing the input

Method	Due date		Cumulative amount
	4/15/85	6/15/85	
80% of expected 1985 tax	\$9,000	\$9,000	\$18,000
100% of 1984 tax	\$10,000	\$10,000	\$20,000
80% of 1985 tax on annualized income to date	\$7,500	\$11,500	\$19,000

Figure 1: Required estimated tax payments under three methods, based on a \$40,000 tax liability for 1984 and an estimated \$45,000 for 1985.

data and then places it on the appropriate tax return forms and schedules.

Other programs have data entry screens that duplicate the line entries of the tax return. You may prefer this input method if you're familiar with tax return forms and schedules.

Methods of printing an actual return also vary. Some programs offer alterna-

Most tax preparation programs use an "input sheet" approach to data entry.

tives ranging from printing pages 1 and 2 of Form 1040 on the actual tax return form and the remaining forms and schedules in an IRS-approved format, to printing the entire return on tax forms using a laser printer (see sidebar, "Tax Form Printing Options").

The number of forms and schedules that the software can handle will probably figure in your choice of software. You should also consider whether the program can produce a state tax return.

The preparation programs we chose to review demonstrate a variety of features. We selected four packages in this category:

Tax Preparer by HowardSoft has been available for several years. Developed for the Apple II+, it was later converted to IBM PC format. It can generate a full complement of forms and schedules, yet, compared to others on the market, it is inexpensive to purchase and update.

PC/TaxCut also offers tax-planning capabilities, but its outstanding feature is full integration with the vendor's home accounting program, *PC/PFP II*. If you have correctly used *PC/PFP II* to maintain your checking account and personal finan-

cial records, you can easily prepare your tax return from the stored data.

Optionware Personal Income Tax is an example of a spreadsheet-based tax return preparation program. This program uses various 1-2-3 templates to input data, compute the tax, and print the tax return. The open structure of the templates allows a knowledgeable 1-2-3 user to modify them for preparing state tax returns or to do tax planning.

TurboTax was selected for two reasons: First, along with its tax preparation capabilities, the program includes a comprehensive tax-planning module; second, the data input screens closely resemble tax return forms and schedules.

In deciding which preparation package is best for you, there are two final considerations—time and cost. Using a computer program to prepare your tax return this year may actually take more time than doing it by hand, but much of the additional time is spent learning new software that may save you time in future years.

Finally, you must ask yourself if the package you're considering is a worthwhile investment of money. Keep in mind that you will probably have to buy an update to the software for next year's return. (A bonus: The cost of the software and subsequent updates is deductible or amortizable on your tax return.)

TAX INFORMATION ORGANIZATION

Software designed for tax information organization is very similar to tax record-keeping software. Tax recordkeeping software expects the user to enter information throughout the year. It requires a double

entry, whereby each transaction affects at least two accounts (for example, writing a check to the phone company requires an entry to the checking account and to the phone expense account). Many people find it cumbersome to enter every check and every transaction twice. Tax information organization programs, on the other hand, help assemble and classify your tax data. These programs are simply prestructured database management systems that define the necessary fields and reports. An experienced database user could easily set up a similar system using any popular database management program.

We chose two tax information organization programs for review:

BIN, as the name implies, sorts tax information into various "bins."

Personal Income Tax Records Manager is a structured database management system that enables you to sort and categorize tax information.

TAX RECORDKEEPING

It doesn't matter whether you prepare your tax returns manually, use a computer, or employ a tax professional, everything still depends on the data you have collected. Effective tax planning and accurate tax return preparation require good information, which in turn requires good record-keeping. Tax recordkeeping software can help make sure you have this information when you need it. Tax recordkeeping and home accounting systems are an offshoot of microcomputer-based general ledger accounting systems for businesses. To use these systems, you first establish the appropriate tax accounts or categories. Then, as you use the system through the year, it sorts the information into the

TWO TAXING TESTS

PC's reviewers challenged the tax software by plugging in numbers from one or both of the following scenarios. The point was not to arrive at a specific result—such as "You owe the IRS \$69,754.52"—since the way a return is structured and the final result depend on the preparer's judgment. Rather, the scenarios provide an identical set of data complex enough to force the programs to exercise all their features.

The Enivels

Philip Enivel is an executive with the SML Corporation, and his wife Tami-Lynn is a physician. They live in Seaforth, New York, with their two children.

In 1984, Phil's total wages were \$115,000. He had total dividend income of \$24,450, and interest income of \$3,350. Of this amount, the interest on U.S. obligations was \$1,500. After expenses, Tami-Lynn's net income from

her medical practice was \$44,169.

Phil had several stock transactions during 1984, which produced long-term capital losses of \$119,000, and short-term capital gains of \$4,000. He also incurred a loss of \$900 on his interest in the operation of a hotel in Syracuse, New York.

Phil received a New York State tax refund of \$800 from last year's return. He received director's fees of \$7,500. Phil forfeited \$51 in interest income in 1984 and contributed \$4,000 to his family's IRAs. Additionally, Phil and his wife made Keogh contributions of \$8,194. Phil donated \$500 to his favorite political candidate and also contributed \$30,750 worth of cash and property to some local charities. Phil paid out \$1,600 for home energy conservation items and \$4,800 for child care and had miscellaneous deductions totalling \$3,010. The amount of interest he paid in 1984 was \$41,080.

For the years 1981 to 1983, Phil's taxable income for income averaging purposes was \$48,000, \$26,000, and \$24,800, respectively.

Phil's federal income tax withholdings ran to \$60,000; his state withholding totaled \$20,000, and his FICA withholdings equaled \$2,533. In 1984, he paid \$13,200 in state estimated taxes and \$50,000 in federal estimated taxes. Other taxes (real estate, sales, personal property, and so forth) totaled \$23,113.

The Henleys

Steven Henley is currently an executive with the National Research Corporation. He previously worked at Computer Data, Inc. He and his wife Jane live in New York with their two young children and Steve's mother. They own an apartment building, from which they rent apartments.

In 1984, Steve's total wages were \$92,000. His dividend income was



\$38,200, and he earned \$6,149 of interest income, \$300 of which was federally tax exempt. After expenses, his net rental income from the apartment building was \$8,720.

Steve sold 200 shares of XYZ and 100 shares of National Research, which produced a long-term capital gain of \$20,170. The sale of 500 shares of MNO and Steve's share of a partnership capital loss produced a short-term capital gain of \$30,886. He also exercised incentive stock options, incurring a tax preference of \$80,000.

Steve had a short-term loss of \$8,420 carried over from last year. He incurred a partnership loss of \$35,715 and received director's fees of \$5,000. Other 1984 expenses included alimony payments totaling \$6,000 and contributions to a spousal IRA, which amounted to \$2,250. He contributed \$750 to his Keogh, donated \$500 to his favorite political candidate, and contributed \$4,950 worth of stock to his favorite local charity. Other charitable contributions amounted to \$5,028. Steve paid out \$400 for home energy conservation items and had miscellaneous deductions amounting to \$2,520. He paid \$5,120 in interest.

For the years 1981 to 1983, Steve's taxable income for income averaging purposes was \$84,300, \$87,430, and \$101,930, respectively.

His federal income tax withholdings were \$27,880; his state withholdings were \$9,395, and his FICA withholdings were \$2,666. In 1984 Steve paid state estimated taxes of \$2,800, and federal estimated taxes of \$20,000. His other taxes (real estate, sales, personal property, and so on) totaled \$5,375. With his 1983 state return, he paid \$237. ■

appropriate categories. This pre-organized data eases tax planning and tax return preparation.

For tax purposes, accounting systems that offer built-in tax planning or tax return preparation are most useful. Systems with-

While tax programs for the PC will not directly save you taxes, they may make your tax task easier.

out these capabilities are still helpful, but they force you to manually transfer the data to a tax return preparation or planning program. We selected the following home accounting packages with tax recordkeeping capabilities to represent this group:

Dollars and Sense (with Forecast) is an easy-to-use program with comprehensive tax-planning capabilities.

Managing Your Money by Andrew Tobias, a well-known financial adviser, is another easy-to-use home accounting program that includes tax-planning features.

PHASAR is an inexpensive yet complete package that incorporates a unique method of "building" the tax-rate tables, allowing you to update the program for changes in the tax rates or tax law. In addition, you can enter separate tables for state or local taxes. Finally, the program offers helpful utilities such as list management and loan analysis.

Any Questions?

As you can see, there are many different facets to using your microcomputer to help with your taxes. Before you go ahead and make any snap decisions, it's a good idea to carefully analyze your situation.

Questions you should ask yourself include: Do I want to spend the time to maintain my checkbook and financial data on the computer? Will I be paying estimated tax? If so, will it be based upon current-year income and deductions? Do I want to spend the time required to learn how to use a tax return preparation program that I will use only once a year? Does my tax situation require the aid and guidance of a tax professional?

You may not come up with clear-cut answers to these questions. If you have hired tax professionals in the past, ask them whether they believe the computer will aid in recordkeeping, in the preparation of your tax return, or in tax planning. While tax programs for the PC will not directly save you taxes, they may make your tax task a bit easier, and they can save you professional fees. ■

A note to tax professionals: While the reviews that follow focus on the use of the computer by taxpayers themselves, the information is also relevant to your profession. If you plan to use the computer for tax planning and preparing tax returns for your clients, consider the clientele you serve. Most microcomputer tax return preparation programs will not be able to prepare all your returns. When you choose a program, give careful consideration to the method of printing—this can be the most time-consuming part of the preparation process. A review of your clients' needs will aid in choosing a program that will help you accommodate most of them.

Mr. Komlyn, CPA, is a tax partner, and Mr. Levine, CPA, is a tax manager in the Computer Assisted Tax Services Group in Price Waterhouse's national office in New York. They are responsible for coordinating their firm's tax department computer activities.

PLANNING

P A C K A G E S

A BIRD'S-EYE VIEW OF TAX PLANNING

TAX DECISIONS

In designing *Tax Decisions*, Eagle Software publishers had the professional tax planner in mind.

Tax Decisions was not conceived as a return preparation tool, although it does print a report with all the calculations that go onto a Form 1040. You can transcribe the information produced onto the official Form 1040 you will file. The truncated supporting schedules and forms contained in the program can be printed screen by screen.

The strength of *Tax Decisions* lies in its capacity to take basic income information for an individual and show up to five different tax variations for a single year on a single screen. This is accomplished by feeding information into a Form 1040 format with optional side trips to any one of over a dozen tax schedules or forms at the line on Form 1040 where they pertain.

How It Works

As you come to each summary line on Form 1040, you have a choice of either



Illustration: Michael David Brown

filling in the net figure or summoning up, with a simple command, a screen showing the basic elements of Schedule C, for example. After you have filled out Schedule C, the program automatically totes things up and takes the result back to line 12 of Form 1040, where it belongs. Then you continue filling in the 1040. The program does the calculations for Schedules A, B, C, D, E, G, SE, and W, plus Forms F-3468, F-4562, F-4797, F-4952, and F-6251.

When you create a plan for the first time, the program moves you through each screen, item by item, before asking if you want to make any changes in the screen you've just done. If you need many schedules, the first plan could be two dozen screens or more. When you're ready to do variations 2 through 5 of the plan, the program lets you protect the first version, replicate it, then go through it again, jumping over items that stay the same and moving directly to those you want to change.

Along the way, you can window in a calculating pad that lets you list, add, subtract, multiply, divide, save to a separate file, and carry the result back to the schedule you're working on. Its operation is a bit more awkward than, say, listing your dividends directly on Schedule B and having the program total the amounts at the end of the list, but it's better than having to leave the program.

Once you have two or more plans fed in for a client, the program has a nifty series of bar graphs to show how the changes in each of the main tax items compare in the different plans. Whether or not you and your client need bar graphs to grasp this kind of tax information is another question altogether.

The manual for *Tax Decisions* contains a picture of almost every screen in the program with a brief step-by-step explanation of what's going on mechanically. It has

menus at some points and a help screen you can call up easily to explain the function commands. It is moderately time-consuming to learn.

What It Won't Do

The program lets you lay out the elements of a tax return calculation. It is not a program that undertakes to explain the tax rules, either on-screen or in the manual. The manual generally contains less tax information than the IRS instructions that come with Form 1040, since a profes-

Tax Decisions has a free CompuServe connection through which you can access the IRS's new database.

sional knowledge of tax principles is assumed.

For example, the program doesn't tell you what the limit on excludable dividends is. You have to go to the manual to find out that it's \$100 per person and \$200 on a joint return, even though you've already filled in your filing status. In another instance, after you tell it your total long-term capital gains on Schedule C, it does not carry 60 percent of that sum over to Form 6251 automatically to calculate the alternative minimum tax. You have to know that you should do this, and you have to multiply out and enter the 60 percent yourself. Of course, you can use the handy calc pad for the multiplication, but that's still a step I expected a tax program to do for me.

In addition, there are some basic things

in the planning area that it does not take up. For example, it does not have a place to feed in the purchase and sale dates of assets (required on Schedule D, Capital Gains and Losses) and, of course, it does not attempt to analyze after-tax results of different kinds of investments or courses of action.

But Can It Do Returns?

Since the program uses the Form-1040 format, it is inevitable that some buyers will try to use the program for preparing returns. In fact, it does do much of the necessary work; the shortfall is in the print-out. First, the built-in printing mode for Form 1040 supports only continuous-feed pages. If you happen to have a letter quality printer that takes one sheet at a time, you'll wind up in a Chinese fire drill as the end of each page approaches and a few wobbly lines appear. Abridged pieces of other schedules and forms can be printed more calmly by pressing PrtSc. *Tax Decisions* deals only with individual returns, not partnerships, trusts, or corporations; nor does it have any state income or sales tax facility.

If you bought *Tax Decisions* last year, you can buy the 1984 update for \$99. It has two copy-protected program disks; you will need to use both of them in drive A: during the course of doing a tax return. Client data goes on your own disks in the B: drive. Backup copies are available to registered owners for \$15.

Tax Decisions also has a free CompuServe connection through which you can access the Internal Revenue Service's new electronic database of tax tips, forms, and official publications, and ordering service. There's nothing much here you can't theoretically get over the telephone from the IRS, but you won't encounter an eternal busy signal.—**Laura Lou Meadows**

CIRCLE 698 ON READER SERVICE CARD

FORESEEABLE FUTURES

FINANCIER TAX SERIES

Financier Tax Series (FTS) is a well-designed program for tax professionals and individual taxpayers alike. Its greatest strength is tax planning: Not only does FTS calculate your current year's tax liability, but it also makes projections of future years' taxes and provides side-by-side comparisons of different tax strategies. This "what if" feature shows you the tax consequences of practically any financial decision.

Inputting Data

After a few initial prompts for such basics as filing status and number of exemptions, FTS asks you for tax data in much the same order as does Form 1040. You enter the raw data into the Base columns, and when necessary, FTS automatically modifies these numbers to produce the values in the Result column. The program takes exclusions and limitations into account when it computes the Result figures for dividends and capital gains. You put the data changes from one year to the next in the Change column and then, once again, FTS calculates the Result column figures.

Since the FTS model is basically a Form 1040, you must manually calculate many of the values before you enter them in the program. For example, you enter

such data as interest income, self-employment income, preference items, and local taxes as net totals. Obviously, your records have to be in order before you start filling in the blanks. Once you're organized, you quickly move from one data-entry screen to the next, and then FTS automatically calculates the tax when you're finished.

Sophisticated Tricks

FTS knows how to treat social security income and correctly handles capital gains and losses. It also properly excludes

such as research credits, alternative foreign tax credits, and nonconventional fuel credits. It also can't do certain year-to-year carryovers; these have to be done manually. On the other hand, these are mostly minor limitations and are clearly described in the documentation.

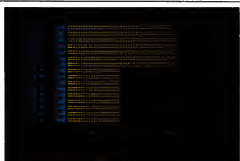
With FTS, you do tax planning and projections by entering tax data in side-by-side columns. To compare different tax strategies for the same year, you add a new column for each strategy; to make projections, make each column a new tax year. Data entry for the new columns is easy because FTS copies the previous column's data and you enter only the changes. The program can handle up to nine different columns of tax data; you can scroll the screen sideways to view three at a time. These side-by-side comparisons allow very efficient tax planning and can be printed out for a permanent record.

FTS has another invaluable planning feature. You can ask it to vary any one of 61 different input values—from gross wages to interest expense to ITC recapture—and figure the tax consequences.

Depreciation Records

FTS has a separate program that keeps depreciation records. You can use any one of nine ACRS methods or four straight-line methods to anticipate salvage values and adjust the depreciation basis for the investment tax credit. The program even includes an annual rollover feature that automatically does the dreary work of calculating each year's depreciation. Unfortunately, FTS gives you no way to integrate the results into the rest of the program: it makes depreciation an intermediate value that you must use separately to calculate the actual numbers you enter into a tax model.

FTS also has a module that calculates the tax treatment of lump-sum distributions. You enter the six values and FTS



With FTS, the screen refreshes very slowly. But this and other irksome problems of user interface are minor compared to the program's great utility for tax planning purposes.

investment interest expense and correctly figures child-care credits, political credits, and casualty-loss limitations. It knows when to claim the two-earner deduction and how to calculate foreign tax credits.

Best of all, FTS calculates your tax liability in three different ways. In addition to the regular tax-table method, FTS can tell you when you should use income averaging and what the results will be if you've entered taxable income for the past 3 years. Finally, FTS will calculate the alternative minimum tax.

FTS can't handle some obscure credits,

does the arithmetic. Once again, this is an intermediate step. *FTS* will not incorporate the results into the tax model.

One of *FTS*'s really strong points is its thorough help feature. At any point in the program, you can get help on either program commands or tax questions. The tax explanations are concise and refer you to pages in J.K. Lasser's *Your Income Tax*, the *U.S. Master Tax Guide*, and the Internal Revenue Code. Further information is available in the clearly written and well-organized manual. Since *FTS* is part of the *Financier* series of financial software, it can exchange data with *Financier II*, a home accounting program.

Irksome Problems

FTS does have some irksome problems. First, the screen refreshes very slowly. For example, it takes almost a second to move the cursor from one data-entry line to the next. You can tap the arrow keys a lot faster than that, and you just have to wait for the cursor to catch up. It also takes too much time to page from one screen to the next.

This slowness also mars the otherwise good help feature. Some texts go on for several screenfuls, but you can't jump back to the program whenever you like. You have to page through to the very last balky screenful before you can get back.

Moreover, the procedure for correcting data-entry errors is harder than it should be. You can't just go back up to the previous line and change a number. You have to wait until you have completed the screen. Only then will *FTS* ask if you would like to make changes.

Of course, these are minor frustrations, but they keep *FTS* from running as smoothly as it should. It's a pity to see a good program weighed down by a second-rate user interface.—Jared Taylor

CIRCLE 697 ON READER SERVICE CARD

PLANNING WITH WORKSHEETS

BNA INCOME TAX SPREADSHEET

Just the mention of tax planning brings to mind special seminars and intricate formulas for mapping out future directions. However, the complexities of money management can be made a lot simpler with BNA Software's *BNA Income Tax Spreadsheet* program.

From long-term capital gains to

**Watching
figures change
instantaneously
gives you a
satisfying
sense of
control over
financial
complexities.**

income averaging and alternative minimum tax—this program does it all. The best of it is that it is effortless to use, quick to complete, and lightning-fast. You can do "what if" projections to your heart's content until you find the strategy that's right for you. You can even run as many as seven worksheets side by side to compare different tax plans on the screen. The design of the program also calculates tax liability for up to 7 years.

Not for Everyone

Although the *BNA Income Tax Spreadsheet* is easy to use, it isn't for everyone.

The \$495 cost can be hard to justify, but for anyone who does tax planning, it is definitely worth the cost, which includes lifetime support via a toll-free telephone number. Updates of the program will be distributed to registered users at a nominal cost.

Speed was the most impressive aspect of the BNA package. Watching figures change instantaneously gives you a satisfying sense of control over financial complexities. Of the three tax programs I evaluated, the *BNA Income Tax Spreadsheet* was the quickest for entering information on the Henleys and the Enivels (see sidebar, "Two Taxing Tests"). It was also the fastest in calculating and presenting the end product.

There are two drawbacks to the program.

First, the function keys are not utilized. Although the menus and choices are logical and swift, function keys would provide a solid consistency to the operation of the program. Second, the program makes no use of color. There's no excuse for subjecting people who have color monitors to white letters on a black background. Perhaps it was merely a programming oversight, but it certainly looms as a disappointment.

Simple-to-Use Menus

The main menu is the starting point for the *BNA Income Tax Spreadsheet*. From there you can work out plans for one year or several. You can also do up to seven variations (which BNA calls cases) for a single year's planning. Lump-sum distribution can also be evaluated from one of the main menu options.

Utility features such as setting options, printing, and clearing (or erasing) worksheets are also done from the main menu; so is saving and loading disk files.

Setting options allows you to choose an inflation rate that can be tied to future-year

TAXES AND YOUR PC

projections. Options also let you set the following specifications:

Number of dollar digits. This can be increased from seven, the default number of digits the program will accept for entered and calculated dollar amounts, to a maximum of ten. However, an increase (or decrease) affects the number of columns the program can display on the screen.

Display cents. This expands all dollar figures to include cents when a decimal point is typed with other numbers.

Printer width. The default width of the program is 80 characters per line. Selecting this option increases the printer width to 132 characters. This option is useful for long-term projections of 5 years or more, or for doing several variations on a given year.

Condensed print. If you have a printer capable of condensed printing, this option will set the printer for you. With this feature, your printouts will fit on standard-sized paper (8½ by 11 inches).

Menus are used throughout, and choices are made by pressing letters. Deciding which item to select is never difficult, since the program functions logically. It's evident at all times that the program was written with a view to a user's potential problems: The clear-cut menu choices leave no room for confusion.

Worksheets and Subworksheets

The heart of the *BNA Income Tax*

Spreadsheet consists of main and subordinate worksheets, which are accessed from the main menu. The worksheets are the same for single or multiple years, except that worksheets for multiple years include columns labeled by year.

	1984	1985	1986	1987	1988
1. Ordinary Income	34,000	34,000	34,000	34,000	34,000
2. Dividend Income	45,000	51,750	55,511	59,404	6
3. Capital Gain/Loss	0	0	0	0	0
4. Rental Income	0	0	0	0	0
5. Other Income	0	0	0	0	0
6. Total Income	79,000	85,750	89,511	93,404	34,000
7. Adjustments	28,000	28,125	28,250	28,375	28,500
8. Taxable Income	51,000	57,625	61,261	65,029	5,500
9. Tax	5,000	5,525	5,951	6,375	600
10. Total Tax	5,000	5,525	5,951	6,375	600
11. Total Tax Payable	5,000	5,525	5,951	6,375	600
12. Total Tax Credit	0	0	0	0	0
13. Total Tax Due	5,000	5,525	5,951	6,375	600
14. Total Tax Paid	5,000	5,525	5,951	6,375	600
15. Total Tax Refund	0	0	0	0	0
16. Total Tax Liability	5,000	5,525	5,951	6,375	600

The heart of the *BNA Income Tax Spreadsheet* consists of main and subordinate worksheets, which store all the data needed for tax forms.

The main worksheet is where you get started. You enter your filing status, personal exemptions, ordinary income, and other items just as you would on an IRS Form 1040. All of this is the basis for the report worksheets that will be printed out for you to work from. If your financial situation isn't complicated (or if you have most of the figures at your disposal), you only need to complete this first worksheet to get a picture of your tax situation. However, if you want to take full advantage of this program's real power, then you need to go to the subworksheets.

Most lines of the main worksheet are tied to subworksheets, some of which have further subworksheets, depending on the nature of the line items. Here's an example of how this works:

You can either fill in the "Ordinary Income" line on the main worksheet or

open up a subworksheet by pressing the W key. Once the subworksheet is opened, you can list wages, salaries, tips, fees, and any other income that is subject to FICA taxes. Spouse's income can also be included. The subworksheet has lines for adjustments such as IRA and Keogh accounts. Consideration has even been given for the two-earner deduction.

This first subworksheet can also be linked to a second subworksheet. For instance, the first subworksheet's line item for "Investment Interest Expense" can lead to its own worksheet when the W key is pressed. This second subworksheet has room for a complete list of interest expenses from all tax schedules and other investments, and the total arrived at is placed on the previous subworksheet's line item. In turn, that subworksheet's total is placed into the "Ordinary Income" line on the main worksheet.

All the information for tax forms is there within the worksheets—it's just that all of the complexities have been removed. There's nothing confusing or intimidating about working within the subworksheets—you just fill in figures next to the items listed.

If a line item has a subworksheet, it is flagged by a diamond-shaped symbol on the far left of that particular worksheet. The program has built-in protection, so you can't wipe out subworksheets unless you really want to. You can erase all the worksheets at any time from the main menu.

All This and a Calculator, Too

A calculator has been cleverly nested into the *BNA Income Tax Spreadsheet*. That's not only a great idea, but an extremely useful one! If you have to do some figuring, you don't even need to hunt down your calculator. Just press the M key for math and you can do almost any kind of calculation manually on the

screen—and the total will be plugged into the line you're working on.

What about mistakes? Mistakes are easily corrected anywhere in the program, and you can change figures as many times as you wish. If you do something wrong or want to change a figure, it's as simple as erasing with a pencil. Everything works so smoothly that it's hard to believe you're doing anything as complex as tax planning.

If at any point you feel that you do need help—or an explanation of something—all you need to do is press H. Once again the program's simplicity and ease of use is evident. The explanations really do clarify a situation and teach you a lot about financial/tax planning as well.

And if all that help isn't enough, the toll-free number will be. Technical assistance is available from 9 a.m. to 5 p.m. (Eastern Standard Time) Monday through Friday. BNA is quick to point out that it does not provide income tax advice, but instead helps people work their way through any problems in using the program. Moreover, a quarterly newsletter is sent to registered users. These arrangements help ensure that once you purchase the program, you will receive proper support and follow-up.

Yes, But Is It Worth It?

The value of the *BNA Income Tax Spreadsheet* is in direct proportion to your needs. When you consider ease of use, instantaneous calculations, and superb customer support, the cost really isn't excessive. In addition, regular updates (at reasonable cost) and a package design so complete that nothing is left out make this software definitely worth considering.

Perhaps the single most important factor is that you can see absolutely everything you need to work with from the main worksheet. All subworksheets feed directly into that. The main worksheet can be

printed on one page, with all of the supporting subworksheets printed as backup material. Being able to see everything in such simple and easy-to-understand terms is where the real value of this tax-planning tool lies.

Printing everything out takes a little longer than it does to do the calculations, but all things considered, if you have the information at hand, you can crunch out your tax-planning figures in less than half an hour. It all conforms to the latest tax laws, and it prints out nice and neat. That only sounds like a fairy tale until you run the program yourself.—**Bill Alvernoz**

CIRCLE 696 ON READER SERVICE CARD

GOLD STAR PROGRAMMING

PROFESSIONAL TAX PLANNER

Tax planning is a form of financial modeling especially suited to computer analysis. It is a classic example of the "what if" problem. Numerous software packages exist to help you evaluate alternatives to find a favorable tax strategy that best reflects your (or a client's) financial goals and comes the closest to being legal.

Even with a computer, however, tax analysis is no easy task, because the federal tax code is as tightly interwoven and difficult to untangle as 12 pounds of overcooked spaghetti. Dozens of different numbers that represent financial transactions must be combined in complicated and seemingly haphazard ways to create the awesome and feared final figure: Total Tax Due.

Aardvark/McGraw-Hill's *Professional Tax Planner* sorts through the confusion to

answer "what-if" questions, and it helps you select the best alternative from among several tax scenarios. Accepting up to 109 different dollar-amount variables for each situation that it analyzes, the software can simultaneously compute five situations that differ in from one to about 100 of those variables and then display a side-by-side comparison of the alternatives. *Professional Tax Planner* is a comprehensive spreadsheet model with sufficient doses of tax law, tax tables, and tax logic built in.

Superior to Spreadsheets

Many tax lawyers and accountants prefer to use spreadsheets for tax modeling. Spreadsheet programs are attractive because the interdependencies of their cells (or data entries) mimic the relationships required by tax law and because they evaluate fact situations whenever you press the Calc key.

A spreadsheet can give you fast, effective, and accurate results, but using one can often be needlessly difficult. It's hardly simple to develop and use the spreadsheet model. In fact, it will probably take you several days to create your own template for tax analysis with 1-2-3 or *Multiplan*. And each time you use it, you have to painstakingly enter each figure and then double-check to make sure you have placed it in the right cell. As a financial consultant, you should spend your time analyzing finances rather than debugging a spreadsheet model and learning to use all sorts of arcane spreadsheet functions.

As a tax analyst's tool, *Professional Tax Planner* circumvents the inherent problems that arise when you use a spreadsheet for tax analysis. It handles tax tables, which cause real problems for most spreadsheets, and the program simplifies data entry with an almost foolproof question-and-answer format. For example, rather than searching out (or trying to

SOFTWARE FOR "YOUR INCOME TAX"

J.K. LASSER'S TAX PREPARATION SOFTWARE DOESN'T LIVE UP TO THE PRECEDENT SET BY ITS PRESTIGIOUS PRINT PREDECESSOR. IN FACT, CALCULATING YOUR TAXES BY HAND MAY BE EASIER.

When the J. K. Lasser Institute introduces a tax-planning and preparation program for the IBM PC, people notice. Lasser's 300-page annual, *Your Income Tax*, has become the most widely used guide to the federal income tax in the United States. On bookstore shelves everywhere, its distinctive yellow-and-red cover heralds the arrival of yet another tax season. Now that Lasser has brought out a software version of the guide, all your troubles are over, right? Not so fast.

Like its printed counterpart, *Your Income Tax* comes in a bright yellow-and-red package. The package contains a floppy disk and a 46-page user's manual, as well as a copy of the original *Your Income Tax* guide. The whole thing sells for \$79.95. In addition, the program includes the Form 1040 and 22 of the most often used schedules and forms.



Your Income Tax
Simon & Schuster
Computer Software Division
1230 Ave. of the Americas
New York, NY 10020
(212) 245-6400
List Price: \$79.95

Requires: 128K RAM, 360K disk drive, optional clock/calendar for date maintenance.

CIRCLE 742 ON READER SERVICE CARD



The book version of *Your Income Tax* is included with the package as a reference.

You can choose to use either tax-preparation or tax-planning mode. Making that choice brings up a main menu window to overlap the first menu. If you choose tax preparation (the main function of the program), this menu accesses the 1040 and related schedules and forms.

To decide which of these forms you'll need, you respond to a four-screen questionnaire. *Your Income Tax* won't let you even look at the 1040 until this questionnaire is completed. Later, as you work your way through the 1040, the program lets you move back and forth at the appropriate points to fill in the required schedules. Only when you've completed all the required forms and schedules will

the program allow you to calculate the taxes. You can then transfer the results to the official IRS form manually or by using the print function, which omits the text and prints only the numbers, on the official form if you wish.

Screen Effects

On a color monitor, the black-and-red-on-gray screen output looks great and is easy to read. But on a monochrome display, the background becomes an irritating green, rather difficult to sit facing for any length of time.

At the top of each screen is a status line that indicates a section of the guidebook that discusses the 1040 line you're completing. An on-line help function is

also available, but I found it to be of little use. Whenever I invoked it, it responded with such helpful hints as "Enter any character and hit Enter."

The on-screen calculator, which you access by hitting F2, pops up in its own window. By using the arrow keys, you can move the calculator all around the screen so it won't obscure something you want to see underneath. On several occasions, however, the calculator cleared itself right in the middle of a calculation—I don't know why. The calculator soon joined the help function in the "don't bother" pile.

Your Income Tax has a few other glitches. On line 38 of the 1040 I entered that I intended to use Schedule G (Income Averaging) to calculate my taxes. When I tried to move to Schedule G, however, the program told me, in effect, "You can't get there from here." In order to get to Schedule G, I had to save the 1040, return to the main menu, and access Schedule G from that point. Then I had to go back to the menu and then to the 1040 again.

Excessive Motion

This moving back and forth takes up a lot of time, as does calculating and saving the 1040. To get to the main menu from the initial Tax Preparation/Tax Planning menu takes 15 seconds. Loading the 1040 takes 20 seconds. It takes another 20 seconds to find Schedule B (Interest Income). Recalculating Schedule B takes about 5 seconds, and 20 more seconds are used up to save that result and return to the 1040.

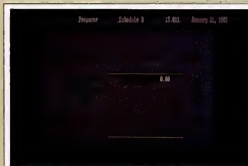
A more serious glitch appeared in the tax scenario. The couple in the second example had a net capital loss of their investments (Schedule D). Rather than

crediting this negative amount against their income, the program calculated it as zero and carried this amount over to the 1040. I tried recalculating Schedule D but got the same result. I wound up having to manually input the correct figure directly on the 1040.

future income, investments, expenses, and so on, and evaluate the alternative tax consequences based on the scenarios you create. The program will accommodate up to 15 different scenarios by which you can theoretically develop the most advantageous strategy for the next 5

years. However, this mode, like the tax-preparation mode, is quite cumbersome to use. You must do most of the preliminary calculations yourself; the program only calculates the final tax liability.

I am not enthusiastic about *Your Income Tax*. The book is the most useful part of the package, and that can be purchased separately for \$6.95. Aside from ensuring that you use



The on-screen calculator pops up in its own window. But occasionally, the calculator cleared itself before it finished the job.

The manual devotes only 4 of its 46 pages to a working reference for the tax preparation portion of the program, and the information is mostly of a general nature. Clearly, the accompanying book version of *Your Income Tax* is intended to be the primary working reference. This intention makes sense, as the book is unquestionably filled with a lot of useful information. But as I worked through the program, I continually found myself asking, "Is this really any easier or more efficient than doing taxes by hand?" The answer, unfortunately, is no.

Tax Planning

In the tax-planning mode of the program, you can make projections about

all the proper forms and schedules, about the only thing this program really helps you do is calculate, put the results on the proper line of the 1040, and sum up the bad news for you. But let's face it—the arithmetic is not the hard part.

Simon and Schuster, the publisher of *Your Income Tax*, released a companion program, J. K. Lasser's *Your Money Manager*, in March. This program should allow you to collect financial data throughout the year and then download it directly into *Your Income Tax* in order to generate a tax return. This program combination could turn out to be a major improvement, but for the time being, I would just as soon do my taxes by hand.—David A. Thrailkill

TAXES AND YOUR PC

remember) which figure is supposed to go into cell G42, you simply type in the value of Business Income when the program asks for it. In other words, rather than sweating over the creation of your own spreadsheet model, you can actually let a product of known accuracy, *Professional Tax Planner*, do the work for you. You can then use your time for what you do best—planning.

Fast and Easy Entry

Professional Tax Planner is easy to learn. The bulk of its manual is devoted to tutorials based on three illustrative fact situations. However, its easy-to-follow, menulike query system let me delve into the program without bothering with the tutorials.

Not only does the question-and-answer approach make *Professional Tax Planner* easy to use, but the clever design of the program makes it fast. For instance, only

masochists would want to type in the same 109 variables five times to analyze five factual situations that differ solely by one parameter, and this program doesn't force you into such stupidity. As you type in

Professional Tax Planner can provide a special report that shows the after-tax effects of investments.

data, the program automatically assumes that each of the 109 variables is the same in all five of the situations being compared—the equivalent of entering a number once and having it automatically pop up in five

spreadsheet cells. Then, if you want to vary that number across the different situations, you need only press the Enter key and type the next value. This wonderfully elegant design cuts your data entry time by up to 80 percent.

As you wander through *Professional Tax Planner*'s query system, the program asks you for data from a smattering of paperwork, including Form 1040 tax schedules as well as supplemental forms. Although the queries might not seem to be in any particular order, they are logically divided and arranged into appropriate categories, such as form income, deductions, and credits.

Professional Tax Planner computes five alternatives that can be divided for different scenarios in a single tax year or, if you wish, projected across several years. In addition, *Professional Tax Planner* can provide a special investment report to show the after-tax effects of investments

TAX PLANNING		List price	Requirements	Quality of documentation	Overall ease of use	Easy manipulation of amounts between plans
BNA Income Tax Spreadsheet BNA Software 1231 25th St., N.W. Washington, DC 20037 (202) 452-4453		\$495	192K, 2 drives, DOS 2.0	Easy to follow	Very easy to use	Yes, and it's fast
Professional Tax Planner Aardark/McGraw-Hill 1020 N. Broadway Milwaukee, WI 53202 (414) 225-7500		\$395	256K, 2 drives, DOS 1.1	Best for folks with good tax knowledge	Easy to use	Yes
Financier Tax Series Financier, Inc. P.O. Box 670, 2000 W. Park Dr. Westboro, MA 01581 (617) 366-0950		\$175	128K, 1 drive, DOS 2.0	Adequate, but on-line help feature is slow	Fairly easy to use; some minor frustrations	Yes
Tax Decisions Eagle Software 5350 Cornell Rd. Cincinnati, OH 45242 (513) 489-7901		\$279	128K, 2 drives, DOS 2.0	Adequate; some on-line help	Fairly easy	No

you have under consideration.

Professional Tax Planner's designers also understood that variables across different factual situations in many financial models are usually related by a simple formula. If, for instance, you assume income will increase by 10 percent every year, *Professional Tax Planner* takes care of it with a couple of keystrokes. Almost instantly, the program fills in all of the five variables across the different scenarios, automatically incrementing each year by the appropriate amount over the previous year. The program even handles simple or compound percentage increases or decreases.

Because the program deals with data entry and calculation separately, *Professional Tax Planner* accepts your data almost as fast as you can type it in. While you peck away at your normal speed at the keys, the program fills in the blanks in its memory. After you've finished, you can

review all the figures for accuracy and edit them if necessary. The program carries out time-consuming calculations only when you issue a command (by making a selection from a menu).

After you've filled in the 109 blanks for

The designers added a modest screen display to the calculating routines to assure you the program is working.

all five situations, you might want to take a coffee break. *Professional Tax Planner* is faced with a truly monumental mathematical problem, and even at computer speed, it takes a bit of time to do the ciphering—

several minutes, at least.

The designers of *Professional Tax Planner* had the foresight to realize that pessimistic users might suspect that their computers had gone to never-never land if the machines didn't display any activity for a long period of time. Consequently, they added a modest screen display (essentially a train of periods that flows across the screen and some reassuring messages) to the calculating routines to assure you that the program is working.

When the figuring is done, you have only to peer down at the bottom line(s). *Professional Tax Planner* calculates the total income and tax liabilities for all the different scenarios. It's up to you to figure out what to do with all the information before you.

No Advice

Professional Tax Planner doesn't provide tax counseling. The program is a pro-

Tax technical help provided	State modules available	Updates available	Number of alternative calculations for the same year	Number of future year projections	Does the program compute tax under all methods?	Does the program carry forward amounts for future year calculations?	Does the program compute the alternative minimum tax?
Yes, on screen	No	Yes, if you register for them	7	7	Yes	Yes	Yes
No	No	Yes	5	5	Yes	Yes	Yes
Yes	No	Yes	9	4 automatically; more with certain adjustments	Yes, except tax tables under \$50,000	No	Yes
Yes, in the manual	No	Yes	5	5	Yes	No	No

professional tool, a calculating engine. It assumes that you are familiar with the ins and outs of the tax laws and you know what figures can be squeezed into, pulled out of, and moved between which boxes on the tax form. Good tax planning involves creativity—a process that is currently beyond the capabilities of the personal computer.

But, even if you are not a tax professional, you can quickly master *Professional Tax Planner*. The manual includes an appendix, which is similar to the IRS instructions for filling out your own tax forms, to help you determine what financial figures are required for each of its questions. By merely stepping through the program and answering each question with data from your own tax forms, *Professional Tax Planner* can help you do rudimentary tax planning. But even with the program's assistance, I don't believe the casual user will be able to develop an optimal tax strategy.

Still, *Professional Tax Planner* can assist you with this year's tax forms. It can do the math. But it can't fill out forms, itemize, or cover all the schedules that the IRS has devised.

Inner Knowledge

Professional Tax Planner may crunch numbers, but current tax laws must determine how they are crunched. Fortunately, a considerable amount of tax law is built into the program. For instance, it covers zero bracket amounts, standard deductions, and indexing. It also automatically computes capital gain deductions and, when used for projections, capital loss carryovers—automatically applying them to your data. The program handles income averaging, minimum and alternate minimum taxes, self-employment, and even Form 4972 10-year averaging for qualified lump-sum distributions.

This built-in legal information makes

Professional Tax Planner particularly easy to use, but it also makes it sensitive to changes in the tax laws. As the program stands, it's quite up to date—Version 3.3 has been updated through the Tax Reform Act of 1984 (TRA). The manual, however, is not quite as recent as the programming because it makes references to 1982 forms and law. But update sheets at the beginning of the loose-leaf book alert you to the changes in the law and the resulting

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inaccuracies that can be found in the balance of the text.

Gold Star Programming

As a computer program, *Professional Tax Planner* gets a gold star with only a little bit of tarnish around the edges. It's quick, clean, and accomplishes its design goals. Written in UCSD Pascal, the program whizzes through screen updates, and yet it is completely compatible with PC-DOS. It stores data in standard DOS files using standard ASCII characters. (Previous versions of *Professional Tax Planner* apparently did not, and this latest issue has a built-in routine that converts the old format to the new.) It permits you to build

unlimited separate files for individual clients and allows you to recall and update them.

The tarnish that needs some polish includes some irksome features that in no way affect the results of tax analysis. For example, the program is copy protected and uses one of the clever schemes that demands you put the program disk in the A: drive. I tried running the program from the B: drive, but it demanded that I put the disk in the right slot and would not let my PC do anything until I acceded to its wishes.

The standard PC version of *Professional Tax Planner* had no problem when I configured it to look to the hard disk for its data files. (The program can be copied to hard disk, but you still have to put the original disk in the A: drive to get it to work.) Moreover, to ameliorate copy-protection problems, such as being put out of action because of a defective disk, the program provides a backup disk.

The only other problem I experienced involved *Professional Tax Planner's* inability to catch printer time-out errors. When my serial printer was not ready, the program simply idled away with a blank screen for 15 minutes, neither complaining nor doing anything else—definitely not an elegant way of handling a rather common error.

Professional Tax Planner handles other errors—for instance, when I sent *Professional Tax Planner* looking for nonexistent files—with appropriate error messages and full recovery.

Professional Tax Planner is a well-executed program that meets its design goals. Unfortunately, while it removes the burden of calculation from tax planning, it does not sufficiently address the planning and preparation stages of filing a tax return.—Winn L. Rosch

CIRCLE 695 ON READER SERVICE CARD

PREPARATION

P A C K A G E S

THOROUGH BUT SLOW

**TAX PREPARER
BY HOWARDSoft**

If you're a tax professional in the enviable position of having more accounts to service than time in which to service them, you're likely to welcome whatever aid technology has to offer. *Tax Preparer* by HowardSoft can give you an electronic assist in preparing, calculating, and printing the normal federal tax return. With *Tax Preparer*, all the bothersome, and tiresome busywork of tax return preparation is reduced to quick data entry, which can be handled by a clerk, so you have more time for the real work of planning tax strategies.

The way *Tax Preparer* functions is as straightforward as it is welcome. After you type in relevant facts and figures, the program crunches the numbers and prints out returns on either official IRS forms or facsimiles, garnishing the result with a cover letter to the client and—a fitting coup de grace—the bill.

Moreover, *Tax Preparer* doesn't limit you to a strict input-and-print routine. You or your assistant can fill a PC to the brim with the financial fortunes of a dozen different clients. Later, perhaps during the lunch hour, you can have your printer



TAXES AND YOUR PC

grind through the whole stack of returns in one big batch, completely unattended—at least if you have faith in things mechanical and continuous-form paper.

Despite some excellent guidance given in its extensive accompanying documentation, however, *Tax Preparer* is not at its best helping the individual taxpayer. Admirably, it does not attempt to give advice on tax strategies or provide consolation. Rather, *Tax Preparer* has been designed as a preparation and planning tool for the knowledgeable tax professional. Although it will fill in all the blanks on Form 1040 and nearly two dozen supporting forms, it's no better than the official IRS instructions at telling you which income and expense items are best put in which blanks, what you can put above and below the line, or whether it's better to depreciate or expense purchases when you have the choice.

Program Depths

The *Tax Preparer* program itself handles all the routine chores—it does all the necessary calculations in the proper order and correctly distributes the results be-

Tax Preparer is a preparation and planning tool for the tax professional.

tween forms. For instance, the various subtotals tallied on Schedule C are automatically poured into the proper blanks on the 1040 and on whatever other forms might require them (for instance, Schedule SF for self-employment tax).

The program has great depth. For

instance, a four-function calculator is always available and can be called into action simply by adding a mathematical sign at the beginning of an entry. You can also itemize entries, laundry-list fashion, merely by pressing a function key. The itemization can be used for completing any IRS schedule—totals will automatically appear in the appropriate blanks on the IRS forms they pertain to. You decide whether or not to include the itemizations themselves on the final printout of the prepared return, or you can print them separately to track an account. In fact, the itemization facility is so flexible, powerful, and extensive that it can function as a bookkeeping system.

Using It

Tax Preparer will no doubt win the most favor around noon on April 15th when its batch data entry features will be

TAX RETURN PREPARATION	List price	Requirements	Forms prepared	Schedules prepared	Quality of documentation
Tax Preparer by HowardSoft HowardSoft 8008 Girard Ave., #310 La Jolla, CA 92037 (619) 454-0121	\$295	64K w/ DOS 1.1, 128K w/ DOS 2.0 and above, 1 drive	1040 3903 2106 4562 2119 4797 2210 5695 2441 6251 3468	A F B G C R D SE E W	Good
TurboTax ChipSoft, Inc. 5674 Honors Dr. San Diego, CA 92122 (619) 587-0118	\$65	256K, 1 drive, DOS 1.1	2106 3903 4797 6252 2119 4136 4952 1040ES 2210 4255 4972 2441 4562 5695 3468 4684 6251	A F B G C R D SE E W	Excellent
PC/Tax Cut Best Programs, Inc. 5134 Leesburg Pike Alexandria, VA 22302 (703) 931-1300	\$195	128K, 1 drive, DOS 1.1	1040 3903 2106 4562 2119 4747 2210 4952 2441 5695 3468 6251	A E B F C G D SE	Good, but not great
OptionWare Personal Income Tax OptionWare, Inc. Corporate Place, 4 Barnard Lane Bloomfield, CT 06002 (203) 243-5554, (800) 334-2355	\$130; introductory price \$99.95	512K, 2 drives, 7-2-3; 80-column printer for 8½" by 11-inch forms	2441 3468 5695	C SE W	Poor; expects user to purchase \$99.95 demo disk

put to the test preparing tax returns in bulk. Using only the numeric keypad, tax return information can be squeezed onto disk almost as fast as it can be pecked in. From a worksheet, a secretary or assistant can type in line numbers and amounts for each of the forms. Then it's up to the tax professional to allocate various amounts to the proper lines on each form where they best fit the taxpayer's strategy. If necessary, the pro can check the accuracy of, correct, or review any line of the electronically stored data.

When the world is saner and deadlines are less ominous than midnight in mid-April, the *Tax Preparer*'s on-screen, calculate-as-you-go version of tax form preparation can be used for tax planning. As you fill in each on-screen blank, the program will immediately calculate all effects of the changes or additions you make throughout the entire set of forms that

make up the return. Once you enter relevant financial data, you can change any line or lines of any or all relevant tax forms, and *Tax Preparer* immediately computes all the ramifications that ripple

Tax Preparer will no doubt win the most favor about noon on April 15.

down to the bottom line. Change the amount of claimed depreciation, and you can quickly (although hardly instantly) see the results in total tax due.

For added versatility, you can use the program's quick print feature to stream out hard copy of various scenarios and use

them for comparison and reference. The program does not offer side-by-side on-screen comparisons of amounts before and after changes, however.

If you've developed your own version of mathematics that deviates from that used by *Tax Preparer*, you can manually override any of the automatic calculations to fit your methods.

Although *Tax Preparer* is essentially menu-driven, how to work your way through the menus may not seem obvious until you've used the program for a few hours. Some assistance is given by a tiny help facility: the bottom two lines of the screen, which can be scrolled through several messages. The intricacies of the program—for the most part, the assignments of the function and control keys—are not difficult to master (particularly when compared to tax law, which you must know well to use the program to its best advan-

Overall ease of use	Can you carry over and edit previous-year information?	Can you override automatic calculations?	Tax technical help provided	State modules available	Updates available	Does the program compute tax under all methods?	Does the program compute the alternative minimum tax?
Good, straightforward, logical operation	Yes, if the information is in the system	Yes	Yes	Yes, for Calif	Yes	Yes	Yes
Very easy to use	No, but planned for future versions	Yes	Yes	Yes, for Calif. and Ariz. In 1986, all major states will be included	Yes, for registered users	Yes; even has 1985 tax rates included for tax-planning purposes	Yes
Cumbersome without a hard disk	Yes	Some, but not all	Yes	No	Yes, for registered users	Yes	Yes
Difficult for a non-1-2-3 user	Depends on next year's package	Yes; formulas are independent of macros	No	No	Yes	Yes	Yes, but some portions must be figured manually

TAX FORM PRINTING OPTIONS

YOU DON'T HAVE TO SUBMIT YOUR ENTIRE RETURN ON OFFICIAL IRS FORMS. YOUR PRINTER CAN GENERATE AN IRS-ACCEPTABLE FACSIMILE—AND USING IT WON'T INCREASE YOUR CHANCE OF AN AUDIT.

Once you enter all your tax data into a preparation program and compute the tax, the next logical step is to print the return. Most tax return preparation programs offer a variety of printing options. They range from a simple print-out to using a laser printer for printing the tax forms themselves as well as the data entered on them. Choosing the best option for your situation is a matter of personal preference and your hardware configuration.

Your printing options can be divided into two major categories—printing in an IRS-approved format or printing on actual tax forms.

IRS Approved Formats

Each year the IRS issues a Revenue Procedure that describes the format in which it will accept a tax return. The

Procedure requires that pages 1 and 2 of Form 1040 be on an actual tax form. The information on remaining forms and schedules may be submitted in a facsimile format generated by your tax preparation program and printed on lined paper.

You can produce the entire facsimile format with your printer, which prints the text of the form along with your data.

While this format is perfectly acceptable to the IRS, some people do not like it because it does not look like a real tax return and they think it will increase the chance of having an audit. Nonetheless, it contains the same information, and the IRS couldn't care less as long as it gets the proper information in an approved format.

Of course, you can always print the

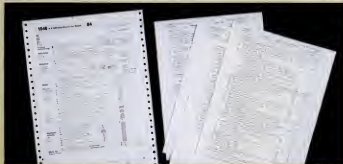
return any way you want and then manually transfer the information to the appropriate forms. Obviously, this method is time-consuming and thus somewhat reduces the benefit of using the computer to prepare your tax return. The choice, however, is yours.

Actual Tax Forms

If you want to print your return on actual tax forms and you do not have a laser printer, you can load the forms directly into your printer or you can print the return on plain white paper and then photocopy it using a transparency overlay of the tax form. Both of these methods are time-consuming and cumbersome and produce less than perfect results. However, if you don't want to manually transfer the information, you must use one of these methods for pages 1 and 2 of Form 1040.

This year several low-cost laser printers have been introduced, and most tax return preparation software has been modified to support them. Laser printing produces a high-quality image of the tax return, which, in most cases, is an exact reproduction of the federal tax forms. The major drawback to laser printing—besides the printer's cost—is the cost of the software to generate the tax forms. Since tax forms change annually, the software is only good for one year's returns.

—Anthony M. Komlyn and Jay J. Levine



IRS forms ready for use with a printer, and acceptable facsimiles.

tage) and include a tutorial so that you can learn it in a structured way.

Tax Preparer proved to be so straightforward and logical that I did not need to call HowardSoft for additional guidance or to stamp out any bugs. Nevertheless, the company promises technical assistance for registered users, either in writing or by telephone. A fill-in-the-blanks form, which is supposed to speed up response to your written pleas for help, is supplied with the program. HowardSoft also recommends using the form as a reference if you call for immediate technical help.

The Letter of the Law

Tax Preparer is so thorough (within its self-proclaimed limitations—the manual wisely admits that it is not a substitute for good tax counsel) that it will help even the casual, corner-store tax practitioner plow through all of this year's necessary forms. The version tested was current through the Tax Reform Act (TRA) of 1984, so it can help keep the casual user up to date and insure thoroughness.

Further, HowardSoft promises updates to *Tax Preparer* as they become necessary (judging from the current legislative climate, that should be pretty soon). The loose-leaf design of the manual—it's about IBM-size, with a stitched, vinyl cover that's a good match for the common legal hombooks—should make any updating easy.

In part, *Tax Preparer*'s comprehensive manual gives a condensed, closer-to-plain-English retelling of the IRS's own guides for marching through tax forms. But the instructions go beyond mere translation and also include highlights of recent tax law revisions and overviews of various tax forms. These aids undoubtedly will be welcomed by occasional tax preparers who don't live, work, and breathe the IRS Code and regulations.

The manual is still nothing that you'd

want to snuggle up with by the fireside on a cold winter's eve—romping through it is just as entangling and unrewarding as a trek through the official IRS newsprint. In other words, *Tax Preparer*'s tax form instructions are an organizational jigsaw puzzle cut from the same cloth as the chaotic tax code itself.

Although I cannot vouch for its accuracy, (when you try to leave no stone

Tax Preparer is slow. You might think you could plow through return preparation faster with an abacus.

turned in tax law, you quickly find that the soil is as rocky as glacial till), every section of the manual I used in preparing sample runs was a valid interpretation of federal tax law. Although neither the word of *Tax Preparer*, any attorney, nor even the IRS can be taken as final and all tax law is subject to interpretation by the courts, the guidance given in the *Tax Preparer* manual is both safe and sage, as well as legally defensible.

Perfect Printing

The *Tax Preparer* includes a built-in facility for printing on an official IRS Form 1040 (as supplied preprinted by the revenue service), including special alignment marks to help get the figures in the correct boxes. The program is wise enough to omit numbers from whatever blocks should remain blank, but it also has a tendency to swallow up zeros trailing the decimal point even when you advise it not to round to the nearest dollar.

All supporting schedules are printed in IRS-acceptable facsimile form, in an IRS-acceptable order that requires no shuffling.

The program allows a single printing session to handle a single form of one client, all forms of a single client, or all forms for all clients (as long as the data is located on the same disk). The program can handle any printer that reacts well to BASIC—I used a high-speed, serial-interfaced dot matrix machine and experienced no difficulty.

Slow Thinker

The biggest problem with *Tax Preparer* is that it's slow, a problem the program manual acknowledges. In on-screen preparation mode, you might think you could plow through return preparation faster with an abacus. It's understandable that the program requires time to weave through a complex web of computations, but given a computer's innate math abilities, something here is dragging its feet.

That something is the programming language. *Tax Preparer* is written in interpreted BASIC. (It's not protected in any way. Remarkably, you can view the source code just by breaking into and listing the program.) Using *Tax Preparer* provides a good demonstration of just how slow BASIC can be. Normal typing is much, much faster than *Tax Preparer*'s display speed. It's very frustrating to over-run the cursor when roaming through forms. Were the program only compiled, it might pick up some impetus.

According to HowardSoft, the interpreted nature of the program assures that it can be readily updated—as well as give the publisher the benefit of having the program be compatible with the widest range of hardware. (*Tax Preparer* is in fact very compatible. It runs on all PC's, the PCjr, TI's Professional, the Compaq, and newer models of the Columbia, Corona, Eagle,

and Hyperion PC-alikes.)

Another delay is caused by disk accessing. *Tax Preparer* loads both program and data in sections, probably to conserve on memory requirements (it requires only 128K). Consequently, when you shift between forms and modes of operation, you can twiddle your thumbs while the new code loads and is digested. Often when you make entries, you have to wait because *Tax Preparer* apparently rushes everything to disk so that power failure damage is minimized.

The speed problems are most severe in interactive mode. Delays in bulk return preparation are not so bothersome.

Hence, to realize the maximum benefit of using *Tax Preparer* in interactive planning, you'll want to have, at minimum, a system with a fast hard disk drive. Adding an 8087 math coprocessor will help speed calculations and program performance (if your BASIC interpreter supports the coprocessor), but the *Tax Preparer* begs for the boost in performance offered by an IBM PC AT.—Winn L. Rosch

CIRCLE 705 ON READER SERVICE CARD

AN OLD RELIABLE IMPROVED

PC/TAXCUT

For the third consecutive year, Best Programs has released its ambitious mainstream tax return preparation package, *PC/TaxCut*. Happily, each year it makes improvements and adds more features, and, as a result, the beta test copy of this year's *PC/TaxCut* is a very sophisticated and well-integrated tax package for

under \$200. In addition to helping you with tax return preparation and its excreciating details, *PC/TaxCut* contains a tax-planning function that puts things on a simpler scale.

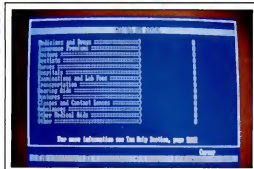
Similar to last year's package, the 1984 edition of *PC/TaxCut* types its results directly onto the Form 1040. It even includes five copies of Form 1040 with tractor-feed holes. For the supporting

working with tax data on input sheets or client organizers, *PC/TaxCut* resembles an old friend. For example, once you start rolling with the list of your business expenses, you will recognize terms that have been plucked from the inner reaches of Schedule C.

At the bottom of each screen, a page reference indicates where the tax rules for that screen are discussed in the extensive

Tax Help section of the manual. Unfortunately, however, the manual's explanations are seldom more than what you'd find in the IRS instructions that come with the ubiquitous Form 1040 and that perennial spring bestseller, *Your Federal Income Tax*.

This year's *PC/TaxCut* introduces a sleek, unobtrusive calculator that you can summon to the bottom of the screen



At the bottom of each *PC/TaxCut* screen, a page reference tells where in the help section of the manual the tax rules for that screen are discussed.

information, it prints out IRS-acceptable facsimiles of Schedules A, B, D, E, F, and G; up to three versions of Schedules C and SE; Forms 2106, 2119, 2210, 2441, 3468, 3903, 4562, 4797, 4972, 5695, and 6251; and attachments for Schedules A, B, E, and Form 2106.

Logical Instructions

If you cringe at the sight of an IRS form, you'll be happy to find that the data input screens of *PC/TaxCut* starts you off with simple instructions. The company promises that "you won't have to translate complex instructions from the bureaucratic language of the IRS" because the program asks you to enter the data "in a logical order." And, if you're accustomed to

where you need it. You can easily operate this calculator from the numeric keypad; it zips right through an interconnected series of multiplications and divisions and carries the result to the data line where you are working.

Good Feedback

When I called Best Programs about the unfathomable 25 percent limitation on the \$5,000 Section 179 business expense deduction, the company assured me that this bug had been exterminated shortly after the beta copy was mailed to me.

The company was also receptive when I groused about the confusion created by a screen that shows a tempting space for you to put in a Qualified Home Mortgage

THE NEW TAX LAW AND YOUR PERSONAL COMPUTER

THE TAX REFORM ACT OF 1984 DECREASES THE TAX ADVANTAGES OF USING YOUR PERSONAL COMPUTER AT HOME AND REQUIRES YOU TO KEEP A LOG OF ITS USE.

On Monday, you use your home computer to prepare a spreadsheet for work. On Tuesday, you boot up *Flight Simulator* and take a leisurely flight from Chicago to New York. On Wednesday, getting down to business again, you sit down to prepare your tax return and write off part of the cost of your home computer—a deduction you are entitled to.

Well, maybe not. With the Tax Reform Act of 1984, Congress closed a perceived loophole. As of June 18, 1984, this act has significantly restricted the deductibility of home use of a personal computer. Under prior law, if you used a personal computer at home in a trade or business (including work done as an employee), for the production or collection of income, or in connection with tax matters, you could depreciate a portion of its cost using ACRS (Accelerated Cost Recovery System) or deduct up to \$5,000 of the cost in the year of purchase. If you choose to depreciate a portion of the cost, you could also apply the investment tax credit to that portion. If, however, you chose to deduct the pro rata cost (up to \$5,000) in the year of purchase, you could not apply the investment tax credit to that portion of the cost.

Under the new law of June 18, 1984, computers and peripherals are referred to

as "listed property"—a category that also includes automobiles, boats, airplanes, and property generally used for entertainment or recreation. The new law disallows application of the investment tax credit and increases the depreciable life to 12 from 5 years, *unless* more than 50 percent of the computer use is in a "trade or business."

"Business use" does not include time spent for the production or collection of income, such as managing your stock

portfolio, or for tax matters, such as preparing your tax return. If, however, you otherwise meet the 50 percent requirement, such uses do count in determining the amount of ACRS depreciation and investment tax credit.

Current Home Use Requirements

The 1984 law will have no significant effect on taxpayers who spend more than 50 percent of their time on their home



(Tax Law sidebar continued)

computer to run a business (even if that business is not their primary source of income). But for those using their home computers to manage their investments or as employees in conjunction with their jobs, the new legislation drastically alters the situation.

Employee use of employee-owned listed property does not qualify for investment tax credit, any depreciation, or full-cost deduction *unless* the use is for "the convenience of the employer" and is "required as a condition of employment." Determining whether the employee is required to use the property as a condition of employment is dependent on facts and circumstances. The law states that use of the computer, or any other listed property, must be required for the employee to perform his duties properly as an employee.

Although the taxpayer is advised to submit an employer's letter to the IRS, explicitly stating the facts, the letter alone will not permit the deduction. The IRS can ask to review the "facts and circumstances" to determine whether the use of the computer is a condition of employment and to categorize the particular use as business. The agency's decision will be based most heavily on this review.

A Case in Point

What does all this mean? Let's look at an example under the current and prior law. Suppose in June 1984, you purchased and placed in service a micro-computer and printer costing \$4,000. For purposes of the example, assume you are in a 50 percent marginal tax bracket. During the period June through December you used the computer for the purposes shown in Figure 1.

Figure 2 shows the tax effects of this scenario if purchased on or before June 18, 1984, or after.

If your job-related use was greater than 50 percent and the total job, investment, and tax-related use was 70 percent, the amounts shown under column 1 in Figure 2 (on or before 6/18/84) would apply regardless of when you placed the computer in service. In addition, you would have the option to deduct \$2,800 ($\$4,000 \times 70$ percent) in the current year and forgo the investment tax credit. You may want to consult with your tax adviser to determine which approach (depreciation vs. deduction) is best for your tax situation.

45% Job Related
20% Managing Your Investments
5% Preparing Your Taxes
70% Total Business, Investment And Tax-Related Time
30% Personal (Educational Programs)
100%

Figure 1: Percentage of computer time spent on tasks done at home.

	On or before 6/18/84	After 6/18/84
Depreciation deduction	\$ 399	\$ 117
Tax rate	$\times 50\%$	$\times 50\%$
Tax savings from depreciation	\$ 199	\$ 58
Investment tax credit	\$ 280	none
Total tax savings	\$ 479	\$ 58

Figure 2: Tax effects of computer use shown in Figure 1.

Consequences of Reduction in Business Use

Under the prior law, when the proportion of business use subsequently decreased below the level of use established in the year that the property was placed in service, investment tax credits and the expensing deductions (but *not* ACRS deductions) claimed in prior years were subject to recapture rules. This meant that you were required to give up—that is, more pointedly, *pay back*—the investment tax credit you had previously applied.

If your "listed property" was placed in service after June 18, 1984, and if your percentage of business use is reduced from *more than 50 percent* to "50 percent or less in a subsequent year," the law will consider that you have sold the *entire* property for investment tax credit purposes, and, therefore, you will have to recapture all unearned credit.

For depreciation purposes, the laws will consider that you have sold that portion of the property which is no longer used in your business. You will have to recapture the excess of the depreciation deduction over the amount that would

have been allowed using a 12-year depreciation period. In cases where the percentage of business use decreases in a subsequent year but remains above 50 percent, the investment tax credit recapture is based upon the reduction in the percentage.

For example, say you purchased a computer on July 1, 1984, for \$5,000 and for 1984, your business use was 60 percent. On your 1984 tax return you took a depreciation deduction of \$427.50 and an investment tax credit of \$300. (If you used the 12-year depreciation period, the depreciation deduction would have been \$125.)

Let's say that in 1985 your business

The Tax Reform Act of 1984 has significantly restricted the deductability of home use of a computer.

use of the PC drops to only 45 percent. Now that you no longer meet the 50 percent requirement, you must recapture and include in your 1985 income the excess depreciation of \$302.50 (\$427.50 - \$125.00). Since investment tax credit is considered to have been earned at the rate of 2 percent per year, this means that you are required recapture the entire \$300.

One final note: Should the business use drop below 50 percent in the 6th through 13th year, recapture rules would still take effect.

Recordkeeping Requirements

The new law also spells out new recordkeeping requirements that further complicate matters. Under prior law, you had to substantiate travel and entertainment expenses by supplying records to show the amount, time, place, and business purpose of such expenses. Moreover, you could submit corroborating evidence to strengthen your claim. Under the new law, you can not.

The Tax Reform Act of 1984 also states that, beginning in 1985, taxpayers claiming deductions or credits will be required to keep "adequate contemporaneous records" that will reflect the business and personal use of all listed property, including personal computers. This applies to property placed in service both before June 18, 1984 and after. If you claim the deduction or credit without supplying supporting records, the law will presume negligence on your part and will subject you to a penalty.

You will be able to meet the adequate contemporaneous record requirement by keeping a log, diary, or similar record. Each of the separate entries must be made "at or near to" the time of use. Records must be kept for both your personal and business use and must contain the date used, time spent, and the purpose of the use. Commercial programs that make use of the system clock are available for this purpose, but we recommend that you create a recordkeeping system by setting up a database with these fields: Date used, Time spent, Business or personal, Purpose of the use. If you update your log regularly you'll have little difficulty meeting the recordkeeping requirements.—Anthony M. Komlyn and Jay J. Levine

Interest Credit. Most users, who are also taxpayers with mortgages and interest payments, would be eagerly asking, "How big is my credit?" However, this isn't a credit for the borrower; it's a credit for the lender, who receives interest on a special type of state bond with proceeds invested in home mortgages. The company assured me that it would try to include an explanation in the manual's next revision.

After you've entered your data, you can call up a series of screens that show the tax calculations. At this point, you can also ask for a printout of all applicable forms and schedules or specify any single form from the on-screen list. The only time you can see your data arranged in the IRS formats is when the paper starts flowing out of the printer. The 1984 package allows a pause between pages so you can use a sheet-fed printer.

PC/TaxCut includes a state sales tax table that automatically figures the standard deduction for your federal income tax return. You can override this to put in another figure. *PC/TaxCut* does not do state income tax calculations.

If you don't have a hard disk, *PC/TaxCut* requires you to do a fair amount of disk-switching during the preparation of a single return. One of the four program disks is copy protected, and you need a separate data disk for each return.

A Year-Long Journal

PC/TaxCut's greatest boosters are the people who use *Best's PC/Professional Financial Planner II (PC/PFD)*, a flexible home-accounting package that lets you enter data month by month all year long and also allows you to go back and make changes in a completed month without forcing you to treat it as a new modifying journal entry. Although I have not tried *PC/PFD*, I have heard that *PC/TaxCut* allows *PC/PFD* users to take all the data they've been laboriously entering into the

PC/FPF lines all year long and convert it into the raw material for their federal tax returns. This doesn't happen automatically, though, because the codes and categories of the two programs are similar but not always coterminous. However, *The Best Connection* program (at \$20) eases the conversion effort.

After using *PC/TaxCut* to complete three moderately complex returns, I was pleased to see that my beta copy lived up to its promises. *PC/TaxCut* requires you to enter the basic data only once. When numbers—either original entries or calculated subtotals—from one form have to be carried to another form, *PC/TaxCut* does it automatically. More impressively, the program also figures out the limits on both easy items, such as the \$200 dividend exclusion for joint returns and itemized medical expenses, and on such pencil benders as the alternative minimum tax.

—Laura Lou Meadows

CIRCLE 704 ON READER SERVICE CARD

PLUGGING INTO 1-2-3

OPTIONWARE 1984 PERSONAL INCOME TAX

Sure, we love to do taxes! Taxes rank right up there with changing a tire on the driver's side, on the freeway, in a snowstorm. So you can imagine our excitement when we were assigned to evaluate an applications program designed to help with personal income tax preparation.

When we received the *OptionWare Personal Income Tax* package and saw that it was an application of Lotus's 1-2-3, our interest quickened. We happen to believe that the 1-2-3 environment is ideal

for this type of application and were anxious to see if the people at OptionWare had simplified tax preparation by using it. After all, the program states right on its package that it "redefines the word 'easy.'" We started with two assumptions—a limited knowledge of taxes and a limited knowledge of 1-2-3.

Getting Started

The package contains a 20-page instruction booklet similar to the "Quick Start" instructions packaged with some other major programs. These booklets are normally a supplement to the comprehensive instructions, but this 20-page booklet was the only set of instructions included with the program. We later found that the comprehensive instructions and demonstration disk are contained within another \$99.95 package, entitled *OptionWare Demonstration*.

In all fairness, it was simple to get the *Personal Income Tax* package up and running using only this simple booklet. However, while there is comprehensive on-screen help with the functions and methodology of the program, it offers no help—either on-screen or in the documentation—to tutor you in tax preparation. The program assumes that you can find the basic information you need in any standard tax guide.

What It Gives You

The *OptionWare Personal Income Tax* program, like the others in the series, is semi-menu driven. Rather than placing the cursor over a menu choice and pressing Enter as in 1-2-3, you use the Alt key plus a second key to select an option. This program has 16 options (menu choices that correspond to program functions), plus more than 140 supplemental choices contained within the main options.

The program is divided into two sections. Quick Tax, the first section, allows

you to input estimates in major income and deduction areas. It processes your estimates and gives you a figure on what your tax consequences may be.

The second section, Full Tax, allows input in specific income, expense, credit, and deduction areas. Full Tax allows you to proceed through the forms and make the appropriate entries in each (if you are knowledgeable in tax matters). Or, by using the input option, you can choose a topic, such as energy tax credit, and the program will take you to the proper entry point on the appropriate form.

There is also an index of all forms and schedules contained in the program. These are as follows:

- Form 1040
- Schedule A—Itemized Deductions
- Schedule B—Interest and Dividend Income
- Schedule D—Capital Gains and Losses
- Form 2210—Underpayment of Estimated Tax by Individuals
- Form 4868—Application for Extension
- Form 6251—Alternative Minimum Tax

Not included are:

- Schedule C—Profit or (Loss) from Business or Profession
- Schedule SE—Computation of Social Security Self-Employment Tax
- Schedule W—Deduction for Married Couple when Both Work
- Form 2441—Credit for Child and Dependent Care Expenses
- Form 3468—Computation of Investment Tax Credit
- Form 5695—Residential Energy Credit

OptionWare plans to make these forms available during the first quarter of 1985 as a supplemental program called *TAX-*

MORE4. As of this writing, OptionWare had not yet decided under what conditions **TAXMORE4** will be offered to the company's existing user base. The currently released program, however, does calculate the amounts for all of the above except Schedule C and Form 3468.

You can print directly onto standard federal tax forms or print facsimile forms on blank paper. OptionWare advised us that the facsimile forms have been submit-

ly, the lack of Schedule C capability made it impossible to deal with the wife's business income or expenses as indicated in the Enivel scenario. Also troublesome were the depreciation and investment tax credits generated by her equipment purchases. These had to be estimated and taken off the gross profit of the business to fit them into the program's format. However, we feel that the addition of the **TAXMORE4** supplemental program, with the appropriate forms and calculations, will allow the **OptionWare** system to complete most tax returns.

Beginners can use the program, but they must be careful. **OptionWare Personal Income Tax** takes you to the spreadsheet template and leaves you there—free to roam around all areas of the spreadsheet, including the macro programming and formula areas. This is

had used the recommended keystrokes, we would have lost all our data (we did several times). An important point when using **OptionWare Personal Income Tax**: Save your data often!

Don't look for **OptionWare Personal Income Tax** to drastically speed up your tax preparation. Preparing taxes seems to take quite a while, no matter what. The program will do most of the calculating for you, and it puts the results in the right place on the appropriate forms. In our book, that's worth \$99.95 any day. —**Brian L. King and Sheldon W. Phillips**

CIRCLE 703 ON READER SERVICE CARD



OptionWare Personal Income Tax takes everything—templates, menus, and programming—and spreads it out over one large spreadsheet.

ted but have not yet received federal approval.

Putting It to Work

The level of complexity required by **PC's** scenarios turned out to be a bit more than the Quick Tax section could handle. With all the consolidation that needed to be done by hand, it would probably have been just as fast to complete the return manually. However, Quick Tax does offer a good way to complete simple returns or prepare rough estimates for complex returns (perhaps as a midyear check for tax liability).

Full Tax, the other program section, was fairly easy to work with. Unfortunately,

fine if you are proficient with 1-2-3; it's dangerous if you are a beginner.

OptionWare Personal Income Tax takes everything—templates, menus, and programming—and spreads it all out over one large spreadsheet. Most of the areas are right next to each other. As an example, a menu screen could share a common border with a template screen, which in turn shares one with a screen full of programming. A user could have portions of four or more different screens appearing on the monitor at the same time. This could easily confuse a beginner.

On certain occasions, we exited the macro routine and had to use 1-2-3 commands to return to the tax program. If we

FLEXIBLE, AFFORDABLE, AND COMPLETE

TURBOTAX

For anyone who has ever spent hours and hours laboring over income tax forms, **TurboTax** from ChipSoft offers welcome relief. Not only does it take much of the pain out of that annual chore, it is extremely affordable as well (\$65 for the complete package).

ChipSoft's claim that you can have the program running after 10 minutes with the manual is correct. After less than a half-hour of working through the manual's well-done tutorial, you are ready to do your taxes. Mike Chipman, the scientist behind **TurboTax**, has trimmed the complexities of preparing computer tax forms into an easy-to-use PC format.

All forms are interlocked, and so figures and information are carried over from form to form. Calculating any form takes only seconds. At any point during the fill-

TAXES AND YOUR PC

ing-in-process you can check for an instant assessment of your tax bracket and find out how much you will owe to or receive from the IRS.

After your first read-through you probably won't use the manual for anything but an occasional reference. *TurboTax* is so flexible and logical that hardly anyone will find it hard to use. The program opens to an income and withholding worksheet. Once you fill it with income, withholding, filing status, and IRA/Keogh data, the program spreads that input throughout the rest of the forms you will be using.

TurboTax's main menu appears on the left side of the screen each time you tap the slash (/) key. You choose options by pressing the first letter of the menu selection you want or by using the cursor keys to highlight your choice and then pressing Enter. You can calculate all input, get a quick look at taxes, go to any of the more than 30 tax forms that are included, or print out your forms. You can move back and forth between forms as you fill in information.

The main menu lets you go to the utility menu from which you can save new information, erase old information, start a new year, set up printer parameters, or quit the program.

TurboTax's ease of use and calculation features alone make it a worthwhile package. However, the program is written with such depth that little seems to be left out. It even includes such built-in "life savers," such as automatically saving all your input before you exit the program.

Flexible Features

A handy "expand" feature allows you to open separate worksheets for such line entries as contributions and expense items. That feature means you can do detailed work right there on the screen—then when you total it all up, the program enters the figure onto the proper line.

Mistakes are easy to correct, changes or modifications of any kind present no prob-

and entering the facts and figures. With *TurboTax* you can cut the amount of time you spend working on taxes down by 70 or 80 percent.

Getting Into Print

Printing out your tax forms is simple and effortless. All forms are printed in accordance with the federal requirements for preparing supporting forms and schedules for the Form 1040. The manual carefully outlines exactly what to do, down to the type of paper to use. Your printer must be capable of underlining because the IRS requires underlining in place of lined paper. You can turn on the underlining feature of your printer through the program's options menu.

Printing out a Form 1040 will require a bit more effort—the IRS will not accept a computer-generated one. However, *TurboTax* gets around that restriction by allowing you to print onto the actual Form 1040. You line up your printer with an x at the right spot at the top of the form, and you're on your way. If the thought of lining your 1040 up in the printer makes you queasy, then you can manually transcribe the *TurboTax* data.

Other States and Updates

Updates for *TurboTax* are offered to registered users at half price. In addition, ChipSoft offers programs for doing state tax returns in California and Arizona at an affordable price of \$30. The company plans to carry similar programs for most major states by 1986.

ChipSoft also offers a professional version of *TurboTax* for \$195. This version is intended primarily for people who are in the tax preparation business. Its added features include laser-printer options and batch printing of tax returns.

—Bill Alvernaz

All of the *TurboTax* forms are interlocked, so figures and information are carried over from form to form. Calculating any form takes only seconds.

lems, and recalculating everything is so quick you can do it as often as you like. You can even set the program to calculate after each entry.

TurboTax follows the instructions on federal income tax forms for all calculations it does. However, since not all situations are covered by these calculations, *TurboTax* lets you override the program and do almost any other calculation you like.

Running both of PC's sample tax returns presented no problems for *TurboTax*. It makes doing your taxes almost fun. When you take out the tedium, anxiety, and frustration of figuring and refiguring tax forms and laboriously typing them up, all you have left is gathering, organizing,

CIRCLE 702 ON READER SERVICE CARD

INFORMATION ORGANIZATION

PACKAGES

SIMPLE AND SPARTAN

BIN

Just cracking open an accountant's journal book—the kind with a trillion ruled columns—is enough to give me vertigo. Unfurling an electronic spreadsheet capable of carpeting Kansas brings on an even dizzier confusion. What I need is a simple recordkeeping system with enough space for the date, the amount going out (or, more rarely, coming in), a place to indicate the account so I can tell whether it was deductible, and a little space for notes to aid my failing memory. Anything else is more trouble than it's worth.

Having written a book on IBM Logo, it was natural for me to write my own little recordkeeping system in that language. After an evening of writing, another of debugging, and a third of adding grand-looking multi-colored menus, I had my system.

Shortly thereafter, I received *BIN* for



Illustration: Michael David Brown

TAXES AND YOUR PC

review. I was delighted to discover that my work was essentially for naught. *BIN* is designed to accomplish exactly the same end as the program I struggled to write—simple recordkeeping—and it works about 10 or 20 times faster.

Philosophically Friendly

I took an immediate liking to the program because I agreed with its underlying philosophy. Simply put, spreadsheets are great analysis tools, but they can be cumbersome for mere recordkeeping.

Certainly, you could pile all your records into 1-2-3 and use an individual column for each account, but *BIN* is much simpler to use. Rather than repeatedly pressing Enter or using arrow keys to skate between columns, you need only strike one code number to tell *BIN* what account (medical, interest, contributions, and so on) to charge.

Once you're used to *BIN*'s simple data-entry procedure, you can quickly type in the account, amount paid in or out, and any notes that you wish to add, separating each "cell" and each complete line with one press of the Enter key. You don't have to keep track of your place. It's automatic, fast, and elegant.

Of course, once you've stuffed the data into the program, you've got to be able to get it out. *BIN* also has a simplified reporting scheme perfectly suited to that purpose. It separately breaks out and lists all the entries to each account and provides an account total. To itemize your tax return, you need only call up a total from each account and enter the grand total *BIN* tallies for you into the appropriate box on your tax form.

Simple Means Spartan

Working with *BIN* is not all roses, however. Wherever I say "simple," you might easily substitute "primitive" or "Spartan." For instance, *BIN* does no fan-

cy calculations (other than addition) within individual accounts. Nor can you adapt it to other purposes, as you can a database or spreadsheet.

You get the minimum you need to

back in tracking expenses and income.

BIN's versatility ends at using header files to adapt to the number of accounts you keep and their names. Headers are easy to create and alter—you type in

the account names, and *BIN* assigns each one a code number. When you want to enter that account, you use that code. You can create several header files to keep different sets of books. The only limit is disk storage space.

BIN stores your data in files apart from the corresponding header files, and the program requires that you select the combination of head-

***** SUMMARY OF ALL BINS *****

BIN	TOTAL AMOUNT	NUMBER OF ENTRIES
INCOME #A	127445.78	5
TAXES #B	18990.88	3
INTEREST	11232.88	1
LEGAL #A	4519.88	2
OFFICE	182.68	17
PHONE	626.51	4
UTILITIES	124.67	3
MAINTEN.	329.32	2
AUTO	690.24	6
TRAVEL	1891.56	2
R & D	559.22	3
ADVERT.	7188.88	1

ENTER 4 TO QUIT OR PRESS ENTER TO CONTINUE - -

***BIN* gives you the minimum capabilities that you need to maintain your records. When you save records, the program displays a summary of them.**

maintain your records: the ability to enter data, display all entries for individual accounts, revise individual entries, and print out one or all accounts (one per page). Aside from the Note column, it doesn't even give you a convenient way to assign a date to each entry—a real draw-

er and data file you want to use at the beginning of each data entry or reporting session.

If you so desire, you can even change files in the middle of a session. In addition, if you're so moved, you can confuse everything by mixing one data file with a

TAX INFORMATION ORGANIZATION

	List price	Requirements
<i>BIN</i> SUPERFLIGHT, Inc. 752 La Para Ave. Palo Alto, CA 94306 (415) 493-5050	\$30	64K, 1 drive, DOS 1.1
Personal Income Tax Records Manager McGraw-Hill Book Co. (1st Base Software) 1221 Ave. of the Americas New York, NY 10020, (212) 512-2000	\$29.95	128K, 1 drive, DOS 1.1

TAXES AND YOUR PC

header other than the one with which it was created.

Reporting

BIN's printed reports are also quite simple. You have two choices: a nonitemized overall report on a whole file or itemized reports on one or more individual accounts within a file. Overall file reports include a heading that identifies the data file you are printing and the time and date of the print-out, the account names, account totals, and the total number of entries for each account. The more detailed individual account reports list all entries in each account. Each account, no matter how short, is printed on an individual sheet of paper. Again, the only serious omission I found was the lack of dates for the individual entries.

The printing functions should work with any printer that can be accessed through BASIC's LPRINT command. Although *BIN* uses no special printer features, the program knows to skip the perforations on continuous-form paper.

Part-time Work

BIN resembles the work of a hobbyist who spent an evening or three writing a bookkeeping system in BASIC, then com-

pling and selling it. In truth, that's what it is (although the accompanying documentation claims that it has gone through months of refinement).

At first, the structure of the program might seem confusing—particularly the need to select the accounts on the screen before printing them. And the instructions, which amount to little more than five mimeographed sheets, might seem inadequate if you are not adventurous. But 15 minutes of trial-and-error exploration is enough to sample all the program's features and get comfortable using them.

As a simple recordkeeping system, *BIN* is reasonably successful. The biggest fault I found—the lack of entry dating—may be just a personal prejudice. Alas, it does point out a grave shortcoming to *BIN*—the program is distributed only as a compiled run-file without source code, so you cannot customize it by adding the particular functions you need.

If you are a reasonably able programmer, you could probably duplicate *BIN*'s functions in a few days or weeks. Still, saving those days or weeks of programming time makes *BIN* well worth its small price.—Winn L. Rosch

CIRCLE 707 ON READER SERVICE CARD

TEDIOUS TAXATION

PERSONAL INCOME TAX RECORDS MANAGER

If you want to impress your business cohorts and coconspirators with your spreadsheet savvy and don't want to take the time to learn *1-2-3* or *Symphony*, *Personal Income Tax Records Manager (PITRM)* may be just the right tax package for you. However, if you're looking for a program that's easy to learn and use, one that will help make your recordkeeping faster and less of a chore, this program is likely to disappoint you.

From the first moment I tried it, I found *PITRM* disconcerting, constraining, and tedious enough to make even an accountant's life sound exciting. Worse yet, the first time I gave *PITRM* some data to chew on, it crashed.

Although *PITRM* looks as if it were designed so that you don't need any knowledge of databases or spreadsheets to use it, you might need an intimate awareness of the alignment of the planets in the Age of Aquarius or good rapport with a crystal ball or Ouija board if you hope to

Quality of documentation	Ease of use	Updates available	Predefined recordkeeping categories	Can one transaction be split among several accounts?	Can the user define the output report?	Can the program sort by tax vs. nontax items?
Minimal, but sufficient	Excellent	No	No	Yes	No	Yes, but you do the sorting when you input data
Generally poor	Straightforward, but tedious	No	Yes	Yes	To a limited extent	Yes, but you do the sorting when you input data

MEDITATIONS ON TAX RETURN REFORM

A LAWYER CONTEMPLATES THE ENORMOUS COMPLEXITIES OF INCOME TAX FORMS AND CONCLUDES THAT ONLY THE IRS ITSELF COULD WRITE A TRULY COMPREHENSIVE TAX PREPARATION PROGRAM.

As I sat down to test tax-planning and preparation software for this issue, I contemplated the 18 hefty volumes of Commerce Clearinghouse's federal tax reporter and the several hundred portfolios of the Bureau of National Affairs tax management series that sit within a few feet of my computer. What a bonanza I thought, if I can run a fully loaded complex tax return through this program and resolve all the questions without resorting to my 30-foot shelf of tax books.

I wish I could tell you that it was all a breeze—but it wasn't.

No matter what anybody says, the first time you use a new piece of tax software to do a Form 1040 and a few of its embellishments, it's no day at the beach. To all the complexities built into the tax rules, you add the challenge of learning a new complicated program. Tax return preparation requires a big complicated program, because if your return involves a business, some investments, or any other flourishes, there is a lot to it. A return is your whole financial history for a year, in which you heed strong admonitions to tell all, especially all the sensitive points. Then you have to give a share to Ronald Reagan and his team if anything good happened to you.

Tax return programs that have been around a few years, like the better pro-

grams in other fields, are becoming easier to use. That means they are better than they were before, but it doesn't mean they are as good as they could be—or good enough.

Pitfalls of Programs

The reality is that putting together a tax return program is a mammoth job. Nobody gets everything into it the first year it's out. I don't mean that a new program will make mistakes in the calculations or give you bad tax advice: The

programs I've seen are all good enough to avoid the obvious pitfalls and wisely disclaim responsibility for advising you. But just because the programs have all the basics doesn't mean they resolve all the questions. They simply try to highlight the more arcane points and tell you to go find more help: more books, more tax advisers.

The complexities of tax law do sometimes trip up these packages, however. In one beta-test program, for example, I stumbled across this bit of esoterica. In



the alternative minimum tax section of the program, under the tax preference adjustments heading, was listed an unusual item, "Tax on Income in Respect of a Decedent," not on the common IRS forms. Puzzled and intrigued, I consulted my 30-foot shelf of books. After far too much time, I realized the screen referred to adding back an estate tax, not an income tax. When I checked the place on Form 1040 where you list your income from an estate, I found that neither the program nor the IRS form mention a fairly rare kind of income technically known as "income in respect of a decedent." Neither the screen, the program documentation, nor the IRS Form 1040 package mention that you are entitled to a deduction for any related estate tax on that item or that the estate's executor may have given you notice of your net income in respect of a decedent after deducting the estate tax from the gross amount. In other words, in its attempt to be comprehensive, the program asks you to add back something it forgot to tell you to deduct in the first place.

Return Reform

Of course, computer preparation of returns wouldn't be so difficult if the returns themselves were easier to fill out. Heaven knows, every year or so the Commissioner of Internal Revenue promises to come up with an easier tax return. Then, just as the form simplifiers make a little progress, Congress throws in a monkey wrench with a political sop, like the alternative minimum tax, that elevates the level of obfuscation all over again.

Still, the government keeps trying. In its November 1984 study, *Tax Reform*

for Fairness, Simplicity and Economic Growth, the Treasury suggests that the Internal Revenue Service initiate a "return-free system" for the 15 million taxpayers who now file the Form 1040EZ. Under this system, the IRS would do all the calculations using the withholding and information returns the Establishment submits about the little folks and then send them a bill. If the first efforts

Computer preparation of returns wouldn't be so difficult if the returns themselves were easier.

work out, the return-free system would be extended to 66 percent of all taxpayers by 1990.

The gravy for the working stiff? The feds say it would save the American people \$1.9 billion in fees paid to professional tax preparers!

This utopia is years away, and besides, it wouldn't effect most of those who want or need to use the tax return programs reviewed in this issue.

For us, next year (while we're waiting for Godot), I wish Commissioner Roscoe Eggers would ask his minions at the IRS to write a microcomputer return preparation package that we could download right from the IRS's electronic Tax Information Database. The IRS may be the only outfit in the country with enough resources to do the job right.

—Laura Lou Meadows

get the program working on your PC. Its instructions appear to be thorough, but they leave out so much vital information that a nonclairvoyant neophyte has little hope of figuring out the arcane wonders of *PITRM*.

A Poor Fit

Part of *PITRM*'s problem is its one-size-fits-all-computers philosophy. The package's instruction manual attempts to cover operation on several types of computers with wildly different operating systems—Apple, IBM, and Radio Shack. In fact, the only guidance that's particular to PC-DOS is a small, single sheet, titled "Getting Started," hidden in the documentation's binder behind the floppy disk, which tells you how to install and backup the program.

Once you work your way around the instructions and have *PITRM* running, you'll find that its data entry procedure is reasonably straightforward. In typical database manager fashion, you are presented with a number of fields (individual entries) into which you type your data, such as record number, description, date, amount, check number, and payee.

Unlike most database management programs, however, the length of your input data and the names of the fields that *PITRM* allows are forever cast in stone at the factory. While the field lengths and captions should work in most situations (20 characters for a description, 8 for the date, 10 for most dollar amounts), you can't do anything to alter them for unusual (or usual) situations.

Most fumbles of the fingers in data entry can be fixed by simply hitting the backspace key and retyping. Pressing Enter puts each field into memory and then starts you on the next field. After you finish the final field in a record, pressing Enter advances you to the first field of the next record.

(continued)

No Timesaver

Although it is easy to use, *PITRM* makes data entry tedious and boring. You're forced to skip through 23 different fields in every record, whether or not you have data to squeeze into all of those fields. If you use the program quite a bit, you may get callouses on your little pinky from pressing the Enter key to skip past unused fields.

Like many database systems, *PITRM* uses record numbers to keep track of each of your records. You are required to assign a unique number to every record that you create because the program does not have an automatic numbering system.

After you've typed in several records, you can review or edit each one individually. However, you can only access the records by their record number. You're forced either to memorize all the numbers or print out your entire database for reference. Moreover, *PITRM* is very literal-minded when trying to match record numbers. Much to my chagrin, I discovered that leading zeros are significant to *PITRM*—the program thinks record numbers 0003, 003, 03, and 3 are entirely different.

PITRM is capable of handling only one data file per disk, which can contain at most 550 records if your computer has just one floppy disk drive and 1,250 if you have two (according to the instructions—I did not bother to try to completely fill a file). If you find that you need more storage, you must switch disks or use a hard disk drive. If you divide your data among several disks, however, *PITRM* is unable to combine all the information into a single report.

The file length limit may have caused my computer to crash when I first tried it. When I tried to add another entry to the already full demonstration file included on *PITRM*'s program disk, my computer locked up. Apparently, just as death is

nature's way of telling you that it's time to slow down, crashing your system is *PITRM*'s way of telling you that your file is full.

When I went through the demonstration file, I discovered that *PITRM* saves its data as characters that do not conform to the standard ASCII code. That means that *PITRM* likely won't share its files with most other programs on the market—and, without retyping all your data, you can't

**Just as death
is nature's way
of telling you
to slow down,
crashing your
system is
PITRM's way of
telling you
that your file
is full.**

move up to a more powerful program once you tire of *PITRM*.

Primitive Reporting

PITRM's report-generating abilities are also primitive. Although you are able to display individual records on your computer's monitor, the program has no provision for previewing an overall report. Much to the delight of the paper industry, you must crank up your printer and run through a complete report to get an overview of your data.

Although the printed reports do resemble the work of a spreadsheet, that's hardly a recommendation. Because each record is likely to represent an amount attributable

to only one account, about 17 columns of each row of the report are cluttered with zeros—actually 0.00—making a rather inelegant and unreadable sheet.

Although *PITRM* gives you a menu of reports to select for printing, all the choices are essentially only minor variations of the same master report. Because a full 23-column report is too wide to fit even on a 132-column printer, each report must be divided into three parts or more horizontal sections. The report possibilities that you are allowed to choose differ only to accommodate different printer carriage widths and how much of the overall report you want to print.

Too Simple to Be Useful

PITRM's biggest problem is that it has been simplified to death. To make it easy to use, all the decisions have been made for you. The resulting rigid structure prevents *PITRM* from letting you realize the greatest value of using a computer for your tax records—speeding up your record-keeping. I particularly dislike *PITRM* because it shortchanges the capabilities of the IBM PC with its built-in "simplifying" limitations and may even discourage new users. It's probably more time-consuming and confusing than manually keeping a ledger, yet it accomplishes nothing more.

Almost any spreadsheet can be used to get the same results as you will from *PITRM*. Although learning to use a spreadsheet requires some degree of effort, you'll most likely find spreadsheet instructions to be more understandable than those provided with *PITRM*. Moreover, using *PITRM* is no faster than a spreadsheet. Considering the alternatives available, I cannot recommend *PITRM* for any reason, any application, or anyone.

—Winn L. Rosch

CIRCLE 706 ON READER SERVICE CARD

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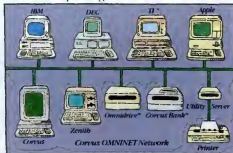
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See us at SOFTCON, booth #2011

CIRCLE 365 ON READER SERVICE CARD

persoft

RECORDKEEPING

P A C K A G E S

PRECISION BUDGETING

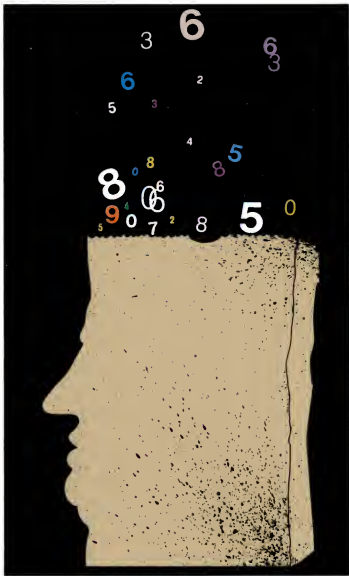
DOLLARS AND SENSE (WITH FORECAST)

Dollars and Sense is basically a month-to-month budget management tool. You can use it to analyze expenses, do efficiency comparisons, make "what if" analyses with its *Forecast* module, keep an eye on cash flow, and even print out a monthly balance sheet. But while *Dollars and Sense* will take all of the information you input and estimate your income taxes, it will not actually fill out your income tax returns. In fact, the manual states: "A word of caution, however; you will find this function invaluable for estimates and for "what if?" forecasts, but it is not advisable to use *Forecast* to prepare your tax returns or as a substitute for professional advice."

Although it won't do your taxes, *Dollars and Sense* is excellent for monthly budgeting, which can give you a good idea of what you will be paying in taxes at the end of the year.

Starting Up

You don't need to have an accounting background to use *Dollars and Sense*—or even know anything about debits or credits. All you need to do plug in the information, such as income and expenses, and



TAXES AND YOUR PC

the program does the rest. Simple instructions prompt you along the way, and since you can modify entries quickly, mistakes are easy to correct. It's obvious that a lot of thought went into taking the intimidation out of budgeting.

However, whatever your background, it is best to begin with the *Dollars and Sense* tutorial, which starts with loading the system and creating a new account disk. You then learn how to define accounts, up to a maximum of 120. How you define your accounts determines how useful *Dollars and Sense* will be as a budgeting tool, so it's important not to rush through it. Defining accounts forces you to take a look at the entire year, including things like property taxes, clothing expenditures, and even miscellaneous expenses.

Debits and Credits

Variable structuring allows for monthly variations in an account. When you define a variable account, the program displays the 12 months of the year you have designated, and you can enter differing amounts per month as you choose. These can be changed again as the year progresses.

While some might view all this as too much time and effort, there are others who would consider this amount of detailed organization as precision budget management. It all depends on individual preference and style. Once you define the accounts, the major task of *Dollars and Sense* is over. From then on, it's a matter of following the budget and entering information regularly. The amount of time spent in keeping things up to date will vary with each individual, according to the depth and extent of budgeting.

Dollars and Sense certainly does take the drudgery out of keeping debits and credits straight. After you enter the information, it does such calculations as splitting up figures (for instance, dividing a

mortgage payment into principal and interest) and then spreading those figures to the proper accounts. The account types include assets, liabilities, income, expenses, and checking; moreover, any tax-

If your checking account always seems to be snarled in mistakes, Dollars and Sense can rescue your sanity.

related items can be flagged.

If your checking account always seems to be snarled in mistakes, then *Dollars and Sense* can rescue your sanity. The program can handle as many as 12 separate checking accounts. It will even write your checks for you if you order the special checks. Reconciling a monthly bank state-

ment, although a bit drawn out (it requires three screens), is done methodically and accurately.

Reports and Estimates

Dollars and Sense has more reports, analyses, and comparisons than the average person will ever need. Nothing is left out. Most people will want to take advantage of the year-to-date summaries, which are real eye-openers to say the least. The income statements, balance sheets, and profit/loss reports are superbly done and extremely helpful to those who really want to keep an eye on expenses, and expense analysis and efficiency comparisons add additional financial tracking. The credit-card management and cash-flow analyses are also very helpful.

Taken together, these reports give you a very clear picture of where you stand financially—but that is only the beginning. One of *Dollars and Sense*'s strongest points is that while you are keeping your budget straight from week to week, you are also building a database that not only keeps your financial records in order but

TAX RECORDKEEPING

	List price	Requirements	Quality of documentation
PHASAR Marksman Technology Rte. 5, Box 221A Santa Fe, NM 87501 (505) 455-2681	\$49.95 plus \$5 postage and handling; order direct from manufacturer	128K, 1 drive	Good
Dollars and Sense Monogram Software 8295 S. La Cienega Inglewood, CA 90301 (213) 215-0529	\$179.95	128K, 1 drive	Easy to follow
Managing Your Money MECA 285 Riverside Ave. Westport, CT 06880 (203) 222-1000	\$199.95	128K, 1 drive, DOS 2.0	Brief manual; most of the documentation is on disk but is cumbersome to use

ties in to the program's report-generating functions. In addition, the program's *Forecast* features let you see where you stand in terms of taxes.

Forecast is the focal point for all tax estimating in *Dollars and Sense*: It compiles and analyzes all the information you have input. With *Forecast*'s tax estimation worksheet, it was easy to see how changing the figures would affect income taxes. This is accomplished so effortlessly that you feel like you should be doing more. Now, if all of this were tied to filling out your tax forms, you could wish for nothing more. However, the amount of tax modeling the program actually does is impressive even without that.

Operations

Because it is written in UCSD Pascal, *Dollars and Sense* will affect certain hard disk partitions. These partitions, which affect how DOS and all programs operate, can be erased or written over during the installation of *Dollars and Sense*. Chapter 4 of the DOS manual, which explains the setup and use of partitions, warns that you

can lose not only files, but subdirectories, too. Back up all hard disk files before you install *Dollars and Sense*. I can't stress this point strongly enough.

While *Dollars and Sense* works well on a monochrome monitor, using color to highlight entries and flag categories enhances it. *Dollars and Sense* is completely menu driven, with choices made by letter keys or Esc. The one confusing aspect of the program is that after you make a menu choice, you must press the letter *p* to proceed. This is awkward because most programs do the same thing with the Enter key. Thus you find yourself constantly tapping the Enter key and then the P key.

Dollars and Sense supports a wide range of printers. You can easily switch to compressed print (132 character per line) or to expanded format (66 characters per line). Normal printing can be done at 80 characters per line. The page format is flexible enough to accommodate most needs.

Assuming you can set up a budget for the year, *Dollars and Sense* will keep track

of all your finances and will produce just about any kind of analysis, comparison, or report you could want. And if you depart from your budget, you can use it to figure the consequences and plan alternative strategies. Combined with *Forecast*'s capabilities, *Dollars and Sense* is a valuable tool for managing your money, as long as you are willing to put in the time and effort to keep things up to date.

—Bill Alvernaz

CIRCLE 701 ON READER SERVICE CARD

NOT FOR TAXES ONLY

MANAGING YOUR MONEY

Managing Your Money, a charming, chatty, splendidly versatile program from Andrew Tobias, the man who tells you about *Getting By on \$100,000 a Year* (and *Other Sad Tales*), is not bad to have

Overall ease of use	Ease of making adjustments to prior months' transactions	Updates available	Built-in tax calculation	Integration with other programs	Can one transaction be split among several accounts?	Can the program sort by tax items vs. nontax items?
Very easy	Very easy	No	Yes	No	Yes	No
Cumbersome at points	Very easy	Yes, free	Yes	No	Yes	Yes
Fairly easy	Fairly easy	No	Yes	Yes, with WordStar, 1-2-3, and other word processors and spreadsheets	Yes	Yes

TAXES AND YOUR PC

around as you approach your annual April 15th tax ritual.

If you bought this home accounting program early last year and have been diligent about feeding your bills, checks, and other important transactions into the program's budget and checkbook function every week or month, you'll be in clover now. If you've properly coded your entries during 1984, *Managing Your Money* will print out neatly organized lists that will elicit tears of joy from your tax accountant, or a smile of deservedly smug satisfaction from you if you plan to do your own return.

The program has seven major functions. The uses of the portfolio manager, the financial calculator, and the insurance analyzer, along with the net worth and calendar reminder sections, were properly extolled in Eric Freedman's review in *PC* (Volume 3 Number 17).

Considering the Possibilities

The income tax estimator is the key function for tax planning. Here, you can look at the essentials of a Form 1040 on the screen and fill in any figures that you would like.

In addition to the skeleton Form 1040, the screen will show you an abbreviated version of Schedules A, B, C, D, E, G, and W, as well as Form 6251, which deals with the potentially expensive alternative minimum tax. Try your actual numbers or those you'd have if you had exercised your incentive stock options at their miraculous new high or if you had loaded every possible penny into a Keogh plan. Push a button and the program computes your federal tax. Change the income or deduction numbers on one of the schedules, and the new bottom line for both the schedule and the 1040 tax appears on the screen in an instant. This means you can quickly try out any tax scenario and see how the tax cost changes.

On a more practical and prosaic level, if you have coded and entered all your transactions for 1984 in either the budget and checkbook function or among your assets in the portfolio manager, you will be able to get an instant reading on what your real federal tax liability will be. You can ask the income tax estimator to read all the tax-coded numbers entered in your budget and checkbook and in the portfolio man-



Managing Your Money displays an abbreviated version of Schedule A. Vary the numbers and the program will show how your tax cost will change.

ager, or you can pick and choose among accounts to be automatically copied onto Form 1040 and any or all of the schedules that you use to calculate your federal taxes.

You'll need to fill in the state sales tax yourself using the tables that can be found in the federal instructions to the Form 1040. To get an idea of what your local income tax bill will be, the income tax estimator function also lets you fill in your own rates for the state and city income tax, in case your local tax rules track the federal system. (The New York State income tax system conforms roughly to the federal system, but *Managing Your Money* doesn't attempt to make the required adjustments.)

Saving Taxes

Like most computer tax packages, *Managing Your Money* advertises that it "should save you time and taxes." Then it hedges its claims by strongly advising that you get a second opinion from a good accountant or tax lawyer before taking any significant action.

Managing Your Money will help you get yourself so well organized that you can

see many of the tax options available. It also suggests investment moves and points out some of the tax consequences. But a home accounting program cannot begin to be comprehensive when it comes to taxes, so if you use it for this purpose, be aware of its limitations. For example, after you've recorded capital gains, neither the portfolio manager nor the in-

come tax estimator warns you that the 60 percent of the long-term capital gain that's excluded from your regular taxable income is a preference item that has to be included in calculating your potential alternative minimum tax. Although the program includes an alternative minimum tax Form 6251, it leaves it up to you to figure out how that relationship works, to do the arithmetic, and to enter the item when you turn to Form 6251.

Mechanics— Now and Next Year

To start *Managing Your Money*, you are required to use the program disk 1, which is copy protected. Two other disks, which hold your data, can be copied so

that you are able to clone separate disks for each year's transactions.

The printouts, though not a substitute for the Internal Revenue Service forms, can be formatted in several useful ways. You can print transactions sorted by tax category, by budget category, or by payee. You can request everything in the category for the year or by the month. You can edit the tax or budget categories before printing, specify the details of spacing, or save the data to a disk file to be edited and printed by a word processing program.

With *WordStar*, I was able to edit a tax file from the income tax estimator, combine it with text, and print the result. One small caveat: Don't let the *WordStar* cursor go all the way to the end of the file or the system will freeze. On my second try, I stopped the cursor one regular character before the end of the *WordStar* file, which was marked by two circumflexes surrounding an @ and zapped the ending symbol before it could zap me.

Another caveat: The program distinguishes between "saving" data that you can change later (which it does often) and "archiving" data that can't be changed (which it will do only if your checks reconcile). To get a formatted printout (other than with *PrtSc*), you must first archive data. When the screen told me to press the F1 key to "try" a reconciliation, I wondered why the instruction was phrased in the conditional. The reason is that this program doesn't speak overdraft, so you may need to plug in a number to force a reconciliation in order to make it archive.

Managing Your Money lets you insert new tax rates and limitations to reflect changes that Congress may have elected to enact after you bought the program. Your congressional representative may not tell you about each and every new wrinkle in the tax laws, but for only \$39.95 and your original warranty card, during the year after your purchase you will receive a

program update disk with any tax law changes and a quarterly newsletter. Any registered owner has access to a toll-free customer service line and a replacement for the copy-protected disk if you send in a damaged one.

And Now, the Manual

Though all the help screens are engagingly effusive, the manual that accompanies the Tobias program is noticeably laconic, consisting of a scant 54 pocket-sized pages of large print with big margins. As explained to me when I phoned the publisher for basic instructions to start entering check register data, the idea was to eliminate the need for a manual by putting all the information you'll ever need right on the disks.

Managing Your Money is not that difficult to use, so the documentation's shortcomings are not insurmountable. Nonetheless, when I needed help, I had to plod through half a dozen or more function and help screens before I found what I was looking for. The effect is like seeing a sign on the highway that reads "57 miles to the next exit"—the natives are very friendly, but when I need to get down to work, I don't want to take the scenic tour.

And please, Andy, in the next release, don't ask me to print up my own index. Like most literate adults who have access to a computer, I can scan three index pages in a few seconds when they are available in traditional hard copy. Printing three pages on my high-decibel letter quality printer took 10 minutes. Aargh.

If you own *Managing Your Money* or if you buy it for its other fine features, by all means use it to estimate your taxes. But if your financial situation involves many complexities, don't rely on this program to eliminate all the work at tax time.

—Laura Lou Meadows

CIRCLE 700 ON READER SERVICE CARD

MORE FOR LESS

PHASAR

What can you realistically expect from a home accounting software package? Transaction recordkeeping? Check printing? Budgeting? Why not. Loan and savings account analysis and a net worth statement? An on-screen calculator, user-defined tax worksheets and schedules, tax calculation? Great. Calendar, phone directory, special-occasion reminder? Okay, enough already. How about fifty bucks for the lot of it? Fifty bucks!

Well, actually, it costs \$49.95 plus \$5 shipping and handling. This program is *PHASAR* (Programmed Home Accounting System And Register), a well-conceived, easy-to-use package that does all of the above and more at an undeniably reasonable price.

Transaction Entry

At the heart of *PHASAR* is its transaction entry function, with which the user is able to record inflows and outflows of funds through a variety of user-defined accounts and categories. *PHASAR* displays a running tally of account balances throughout, so there is never any doubt where you are in the program at any given time. The transaction data can then be used to call up account summaries, see how actual expenditures compare with the budget, calculate taxes, and more. Split-category transactions pose no problem to *PHASAR*. It's easy to allocate different items purchased with one check to all of their various expense categories. The on-screen calculator adds, subtracts, multiplies, and divides without disturbing the current screen. *PHASAR* will even print the checks for each transaction.

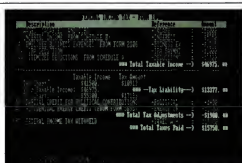
With the assistance of the manual, a

light-hearted, complete, well-indexed, and altogether quite helpful accessory, I had PHASAR booted up and running in practically no time. The two PHASAR disks come with the tutorial data already on them. After a brisk run through the tutorial, I was sufficiently familiar with the ins and outs of the program to feel comfortable with it. The help function (always accessed by F1) was there when I needed to jog my memory. Clearing the tutorial data from the disk is easily accomplished by invoking the "modify setup" function from the main menu. Using the same function to create my own set of accounts was a snap. PHASAR can handle 19 accounts, 47 expense categories, 29 income categories, and as many as 250 transactions every month.

PHASAR's tax analysis feature makes good use of the information contained in the transaction records. Using either actual or budgeted amounts, the user can define up to ten different tax calculations (federal, state, city, or whatever). PHASAR does not include any methods of tax calculation in the program itself, so the user must define them by copying the data from the applicable IRS schedule to the tax table at the bottom of the calculation screen. While this may seem an inconvenience at first, I consider it an important advantage of the program—there is no need for updates from the vendor as the tax laws change.

PHASAR has 20 tax worksheet screens that are used as forms and schedules for doing most of the arithmetic: itemizing

deductions, income averaging, and so on. Names of income and expense categories can be used in the calculations, similar to using range names in 1-2-3. Worksheet results can be given a name (the result of Schedule A for itemized deductions could be called simply "Deductions"), which is used in the tax calculation screen to refer to that particular result. Believe me, it's really much easier to do than it is to describe.



PHASAR's Form 1040 is one of the program's 20 tax worksheet screens used as forms and schedules for doing calculations such as income averaging.

Doing a midyear tax projection is no problem at all. PHASAR's summary reports submenu contains a budgeting function, which allows the user to set up monthly budget figures for all income and expense categories. In making the midyear tax projection, PHASAR will use whatever actual data it has as well as the budgeted data for the other months. Another very useful feature of PHASAR's budgeting function is its ability to plot a graph of budgeted vs. actual figures for any income or expense category or any combination of the two.

PHASAR's financial analysis module is capable of generating a net worth statement and analyzing up to eight loans and

savings accounts. For any equal-payment, self-amortizing loan (such as a mortgage), you can quickly calculate the amount of interest paid in a given year—certainly helpful when figuring interest deductions at tax time.

List Management Feature

The list management module will keep track of 250 names, addresses, and phone numbers and display a calendar, 2 months to a screen, on which you can highlight special occasions. There are also 20 screens available for general-purpose lists, presumably of the shopping/laundry list variety.

Printing reports, like everything else about PHASAR, is easy and straightforward. Account summaries, tax calculations, lists, and checks are printed by making menu choices. Other screens can be printed with the PrtSc key. Although PHASAR doesn't permit user-defined output formats, it is a minor disadvantage considering the clean, well-organized format of PHASAR's screens.

As an integrated home accounting package, PHASAR has some limitations, but not very many. One caveat, however. Obviously, PHASAR cannot do the thinking for you; it is the responsibility of the user to verify the accuracy of his records and calculations. PHASAR does some rather useful things with the information it is given; if that information isn't correct, however, the program doesn't flinch. Luckily, PHASAR's extensive editing features allow you to make changes or correct mistakes before the IRS and angry creditors come knocking at the door.

Considering PHASAR's features and ease of use, it is a very useful home financial management tool. And considering its price, it is an exceptional value as well.

—David A. Thraikill

CIRCLE 699 ON READER SERVICE CARD

MORE TAXING CHOICES

THE TAX SOFTWARE REVIEWED IN THIS ISSUE REPRESENTS ONLY A SAMPLE OF WHAT'S AVAILABLE. HERE'S A LISTING OF OTHER PACKAGES THAT ARE ON THE MARKET.

RECORDKEEPING SOFTWARE (HOME ACCOUNTING)

Certified Personal Accountant

Progressive Peripherals & Software, Inc.
2186 S. Holly, #200
Denver, CO 80222
(303) 759-5713
List Price: \$149.95

Requires: 128K RAM, two disk drives.

CIRCLE 781 ON READER SERVICE CARD

Expense Track II

Sapana Micro Software
1305 S. Rouse
Pittsburg, KS 66762
(316) 231-5023
List Price: \$69.95

Requires: 128K RAM, one disk drive.

CIRCLE 780 ON READER SERVICE CARD

Financier II

Financier, Inc.
2000 W. Park Dr.
Westboro, MA 01581
(617) 366-0950
List Price: \$195

Requires: 196K RAM, two disk drives.

CIRCLE 789 ON READER SERVICE CARD

Home Budget

IBM Corp.
P.O. Box 1328
Bozota Raton, FL 33432
(305) 998-6048
List Price: \$60

Requires: 64K RAM, one disk drive.

CIRCLE 788 ON READER SERVICE CARD

MoneyTrack

Pacific Data Systems, Inc.
6090 Sepulveda Blvd., #480
Culver City, CA 90230
(213) 559-8713
List Price: \$295

Requires: 128K RAM, two disk drives.

CIRCLE 787 ON READER SERVICE CARD

My Accountant

Ensign Software
7337 Northview
Boise, ID 83704
(208) 378-8086
List Price: \$69.95
Requires: 128K RAM, two disk drives.

CIRCLE 786 ON READER SERVICE CARD

PC/PPP II

Best Programs, Inc.
5134 Leesburg Pike
Alexandria, VA 22302
(703) 931-1300
List Price: \$245

Requires: 128K RAM, two disk drives.

CIRCLE 785 ON READER SERVICE CARD

The Personal Financial Manager

Lumen Systems, Inc.
P.O. Box 9893
Englewood, NJ 07631
(201) 592-1121
List Price: \$200

Requires: 128K RAM, two disk drives.

CIRCLE 783 ON READER SERVICE CARD

Quicken

Intuit
540 University Ave.
Palo Alto, CA 94301
(415) 322-0573
List Price: \$99

Requires: 196K RAM, one disk drive.

CIRCLE 784 ON READER SERVICE CARD

The Smart Checkbook

Softquest, Inc.
P.O. Box 3456
McLean, VA 22103
(703) 281-1621
List Price: \$149

Requires: 128K RAM, two disk drives.

CIRCLE 781 ON READER SERVICE CARD

TAX INFORMATION ORGANIZATION SOFTWARE

The Cheapware Tax Record

Robert L. Nicolas
4038 N. Ninth St.
St. Louis, MO 63147
(314) 621-7618

(800) 622-4070 (orders only)

(800) 942-7317 (orders only, Illinois)

List Price: \$27.50

Requires: 64K RAM, one disk drive.

CIRCLE 778 ON READER SERVICE CARD

Personal Finance

Acorn Software Products
353 W. Lancaster Ave.
Wayne, PA 19087
(215) 964-9103
List Price: \$29.95

Requires: 128K RAM, one disk drive.

CIRCLE 780 ON READER SERVICE CARD

TAX PLANNING SOFTWARE

INFO-TAX

Computer Realty System, Inc.
5712 Magic Mountain Dr.
Rockville, MD 20852
(301) 468-1055
List Price: \$95

Requires: 128K RAM, one disk drive.

CIRCLE 788 ON READER SERVICE CARD

Model 1040

Success Management Consultants
318 Surfview Dr.
Pacific Palisades, CA 90272
(213) 454-8030
List Price: \$195

Requires: 64K RAM, one disk drive.

CIRCLE 779 ON READER SERVICE CARD

Planmode

J.P. Sawhney & Co., Inc.
888 Seventh Ave.
New York, NY 10106
(212) 541-8020
List Price: \$395
Requires: 128K RAM, one disk drive.

CIRCLE 777 ON READER SERVICE CARD

Shortax+Plus

Syntax Corp.
4500 W. 72d Terr.
Prairie Village, KS 66208
(913) 362-9667
List Price: \$395

Requires: 56K RAM, one disk drive.

CIRCLE 776 ON READER SERVICE CARD

The Tax Advantage

(integrates with The Home Accountant Plus)
Arrays, Inc./Continental Software
11223 S. Hardy Ave.
Los Angeles, CA 90045
(213) 410-3977
List Price: \$69.95

Requires: 128K RAM, one disk drive.

CIRCLE 782 ON READER SERVICE CARD

Tax Break Planner

Proforma Software Co.
2706 Harbor Blvd., #203
Costa Mesa, CA 92626
(800) 248-7923
List Price: \$180

Requires: 128K RAM, two disk drives.

CIRCLE 775 ON READER SERVICE CARD

Tax Mini-Miser

Sunrise Software
36 Palm Ct.
Menlo Park, CA 94025
(415) 441-2351
List Price: \$295

Requires: 64K RAM, two disk drives.

CIRCLE 774 ON READER SERVICE CARD

(Tax Planning Software continued)

Taxmode

J.P. Sawhney & Co., Inc.
888 Seventh Ave.
New York, NY 10106
(212) 541-8020
List Price: \$295

Requires: 128K RAM, one disk drive.

CIRCLE 771 ON READER SERVICE CARD

Tax Shelter 1984

Navic Software
P.O. Box 14727
North Palm Beach, FL 33408
(305) 627-4132
List Price: \$45

Requires: 64K RAM, one disk drive.

CIRCLE 772 ON READER SERVICE CARD

Tax Strategist

Quadram Corp.
4355 International Blvd.
Norcross, GA 30093
(404) 564-1975
List Price: \$295

Requires: 128K RAM, two disk drives.

CIRCLE 773 ON READER SERVICE CARD

**TAX RETURN
PREPARATION
SOFTWARE**

LMX-TAX

Laser Micro Software
3191 "D" Airport Loop
Costa Mesa, CA 92626
(714) 432-9621
List Price: \$795

Requires: 128K RAM, two disk drives

CIRCLE 782 ON READER SERVICE CARD

Mark I Tax System

Storren Tax Service, Inc.
736 Main St.
Brownsburg, IN 46112
(317) 852-7000
List Price: \$750

Requires: 128K RAM, two disk drives

CIRCLE 787 ON READER SERVICE CARD

Microtax Bronze

CLR Microtax
2395 Midway Rd.
Carrollton, TX 75006-2504
(800) 642-7689
List Price: \$295

Requires: 192K RAM, two disk drives.

CIRCLE 788 ON READER SERVICE CARD

1984 Tax & Financial Guide

Guidance Software, Inc.
P.O. Box 5362
Kingwood, TX 77339
(713) 360-3561
List Price: \$159.95

Requires: 256K RAM, two disk drives.

1-2-3

CIRCLE 750 ON READER SERVICE CARD

PC-Tax

Contract Services Associates
706 S. Euclid
Anaheim, CA 92802
(714) 635-4055
List Price: \$349

Requires: 64K RAM, two disk drives.

CIRCLE 752 ON READER SERVICE CARD

Quick-Tax Professional Series

Quick Tax, Ltd.
319 Clawson St.
Staten Island, NY 10306
(718) 351-6143
List Price: \$1350 (federal tax package)

Requires: 128K RAM, two disk drives.

CIRCLE 760 ON READER SERVICE CARD

Standard Tax Program

CPAs, Inc.
1061 Fraternity Cir.
Kent, OH 44240
(216) 678-9015
List Price: \$995

Requires: 192K RAM (128K RAM w/ DOS 1.0), two disk drives.

CIRCLE 764 ON READER SERVICE CARD

SUPERTAX

Rockware Data Corp.
P.O. Box 365
Plano, TX 75074
(214) 596-0588
List Price: \$99

Requires: 64K RAM, one disk drive.

CIRCLE 765 ON READER SERVICE CARD

Tax Break Computer

Proforma Software
2706 Harbor Blvd., #203
Costa Mesa, CA 92626
(800) 248-7923
List Price: \$180

Requires: 128K RAM, one disk drive.

CIRCLE 761 ON READER SERVICE CARD

Tax Manager

MicroLab
2699 Skokie Valley Rd.
Highland Park, IL 60035
(312) 433-7550
List Price: \$250

Requires: 128K RAM, two disk drives.

CIRCLE 754 ON READER SERVICE CARD

Tax/Pack II

Analytical Processing Corp./
Alpine Data Services
635 E. Main St.
Montrose, CO 81401
(303) 249-1400
List Price: \$80

Requires: 128K RAM, two disk drives.

CIRCLE 753 ON READER SERVICE CARD

TaxPax

Taxpax
337 N. Vineyard, #400
Ontario, CA 91764
(714) 983-1187
List Price: \$750

Requires: 64K RAM, two disk drives.

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Dumphy Systems, Inc.
2215 Deewood Dr.
Columbus, OH 43229
(614) 891-2131
List Price: \$99

Requires: 128K RAM, one disk drive

CIRCLE 758 ON READER SERVICE CARD

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Micro Vision
145 Wicks Rd.
Commack, NY 11725
(516) 499-4010
List Price: \$149

Requires: 128K RAM, two disk drives.

CIRCLE 757 ON READER SERVICE CARD

TaxSimple

AJV Computerized Data
Management
25 Central Ave.
Mine Hill, NJ 07801
(201) 989-8955
List Price: \$245

Requires: 128K RAM, two disk drives.

CIRCLE 756 ON READER SERVICE CARD

TAXSTAR

Professional Tax Software, Inc.
26 Lark Ln.
Croton-on-Hudson, NY 10520
(914) 271-4722
List Price: \$279.95

Requires: 64K RAM, two disk drives.

CIRCLE 755 ON READER SERVICE CARD

TAX SURGEON II

TAXbyte, Inc.
3803 28th St.
Moline, IL 61265
(309) 764-7245
List Price: \$89.95

Requires: 128K RAM, one disk drive.

CIRCLE 762 ON READER SERVICE CARD

TaxWizard '84/85

Gamma Productions, Inc.
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Santa Monica, CA 90403
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CIRCLE 749 ON READER SERVICE CARD

Softax

Design Trends Ltd.
525 S. Washington St.
Naperville, IL 60540
(312) 357-2664
List Price: \$199

Requires: 128K RAM, two disk drives.

CIRCLE 747 ON READER SERVICE CARD

TaxCalc

TaxCalc Software, Inc.
4210 W. Vickery Blvd.
Ft. Worth, TX 76107
(817) 738-3122
List Price: \$150

Requires: 128K RAM, two disk drives.

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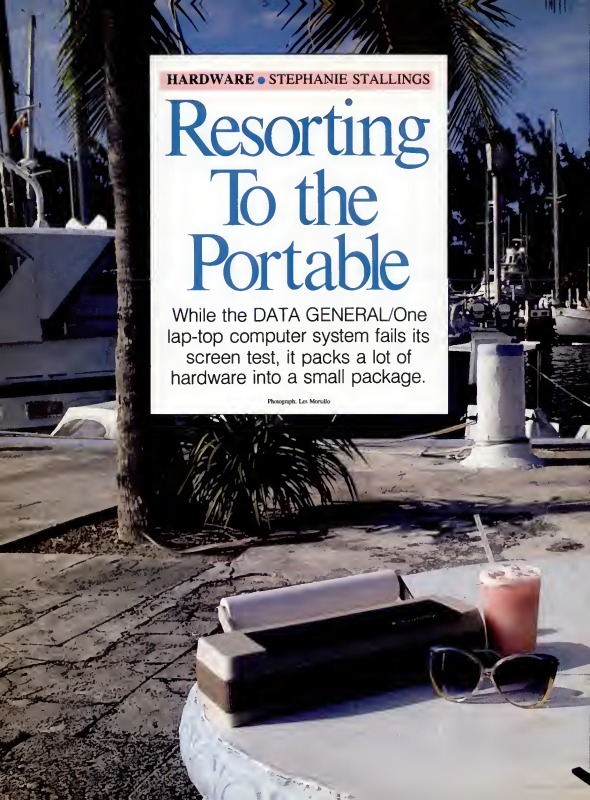
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Resorting To the Portable

While the DATA GENERAL/One lap-top computer system fails its screen test, it packs a lot of hardware into a small package.

Photograph: Les Morillo





Surprisingly, the DATA GENERAL/One portable computer (DG/1 for short) encourages coziness among its users: There's no alternative to cheek-to-cheek closeness when two people try to view the screen together. Even though the liquid-crystal display is a full-size 25 lines by 80 characters and boasts full graphics capability, the gray-on-gray screen has so little contrast and so much reflection that viewing it is like trying to read an old newspaper submerged in a muddy pond.

The DG/1, advertised as "The Personal System for People on the Go," is nevertheless an impressive attempt to provide everything you could dream of in a portable computer system. (For an earlier perspective on the DG/1, see "A Serious Lap Computer at Last," *PC*, Volume 4 Issue 2.) It weighs less than 10 pounds, has two internal 3½-inch disk drives and an internal 300-baud modem, and offers an external 1200-baud modem, a separate 5¼-inch disk drive, and a 4-pound printer. That's a lot of hardware.

It's also a lot of money. The stripped-down system, consisting of the computer with 128K RAM and one 3½-inch internal disk drive and absolutely no other internal or external components, costs \$2,895! By comparison, the new Tandy 200, with its full complement of 72K RAM, a 16-line by 40-character display, and an internal modem, currently sells for just \$999. (For a review of the Tandy 200, see "The Tandy 200 Lap Computer: A Lightweight

Heavyweight in this issue.) A full-blown DG/1 system, including the 5¼-inch drive, printer, and the necessary extras, will run about \$7,350. People on the go who want to take this system with them should consider increasing their theft insurance—and perhaps their personal insurance as well.

The Computer

The computer measures 13½ inches deep by 11½ inches wide by 3 inches high, so while you *could* hold it in your

The DG/1 is an
impressive attempt
to provide
everything you
could dream of in
a portable
computer system.

lap, it's much more comfortable on a desk-top. The cover lifts up to reveal the keyboard and screen.

Three printed circuit boards control the DG/1, with the main PCB carrying the CPU, RAM, ROM, and display and keyboard controllers. The machine can hold a maximum of 512K of internal memory, with 48K reserved for display memory. In addition, you can purchase an external memory card cage that holds up to five additional 128K cards. The microprocessor is the CMOS 80C88, Intel's low-power, low-heat version of the 8088 used in the IBM PC.

The second printed circuit board handles I/O and contains the floppy disk controller, two asynchronous interfaces, and a real-time clock. The power PCB controls the rechargeable battery pack, which will run up to 10 hours. You can also plug the DG/1 into the wall with an AC adapter. Average power consumption with the full 512K is 6 watts.

The accompanying literature advises that only a qualified service technician should open the machine for servicing. I heartily agree. My curiosity having gotten the better of me, without knowing which clips and screws to remove and in what order, I found various parts popping out all around me. And the cards, disk drives, and ribbon cable are so tightly packed together that it would be easier to put Humpty Dumpty back together again. Taking the computer back to the dealer makes it his problem—though your pocketbook may suffer.

The Infamous Screen

The headache-inducing display is the DG/1's most disappointing feature. Using it involves constant, annoying adjustments of the contrast, the lighting, and your own position as you attempt to view the screen comfortably. You cannot adjust the slant of the display to improve the viewing angle, and you have to stay within a 30-degree horizontal arc of it. Bright backlighting improves visibility but must be weighed against increasing the screen's glare. These problems make it difficult to appreciate the presence of a 256- by 640-pixel resolution screen on such a small computer.

Data General recently introduced a new "non-glare" optical-quality lens for its screen. It was not included in the review model, and Data General never volunteered it. When I mentioned that I'd heard about the lens, however, the company sent it to me right away.

I popped out the old lens and easily snapped the new one into place. Although it did seem to reduce the glare a little bit, it was not enough to dramatically improve the situation. Though I was careful to turn the non-glare side of the lens outward, I could see my reflection more clearly in the new one than in the old one. Removing both lenses gave the clearest view. Unfortunately, this tactic could prove detrimental to your computer's health, unless you happen to live in a microchip assembly "clean room."



DATA GENERAL/One

Data General Corp.
4400 Computer Dr.
Westboro, MA 01580
(617) 366-8911

List Price: \$2,895 with 128K RAM, one 3½-inch disk drive; \$5,595 with 512K RAM, two 3½-inch disk drives, and 300-baud modem; \$525 for printer; \$899 for 5¼-inch disk drive.

CIRCLE 693 ON READER SERVICE CARD

The Keyboard

The DG/1's keys are a bit more tightly packed than those on the Tandy 100, but not uncomfortably so, and their clicky feel is neither too heavy nor too light. The special-purpose keys, such as the Home, PgUp, PgDn, End, and PrtSc keys, have been relegated to the top and bottom rows on the far right. The function keys are arrayed along the top row, and the Ctrl, Alt, and Del keys are close to their usual places. An additional key, labeled Cmd, increases and decreases screen brightness when used with the PgUp and PgDn keys. DG saved space by superimposing the numeric keypad on the alphabetic keys. Red legends indicate what these keys will do in the NumLock mode.

Small Disks, Big Storage

The 3½-inch disk drives are on the right side of the DG/1, which means that you have to peer around the side of the machine to angle a disk into place. Since you couldn't see them anyway, DG left off drive indicator lights. The disks snap in, then pop out with a push of a button. The great thing about them is that each small square holds an amazing 720K of data, twice the capacity of a 5¼-inch disk. The usual DOS commands suffice to pass data between a standard drive and the small ones.

The 5¼-inch Drive

With its vertical insertion slot, the external 5¼-inch disk drive looks like a front-loading toaster. It stands 8½ inches tall, just less than a foot deep, and about 5 inches wide. And, at about 12 pounds with an unwieldy shape, it's hardly portable. The DATA GENERAL/One may be a portable lap-top computer, but this peripheral is meant to stay home.

To install the drive, you must first plug and screw down a narrow transceiver to the back of the computer, then plug the drive's input/output cable into the transceiver. When I tried it, no amount of pressure or finesse would force the transceiver to snap into place, even though the manual

suggested that this was all that was necessary. Only after I pulled the connector panel cover off the back of the DG/1 and removed the metal guard protecting the open side of the transceiver's socket was I able to slide the transceiver into place.

Unlike the Compaq's vertical floppy drives, the Data General 5¼-inch drive requires that you insert the disk with the write tab facing up and the label to the right. The drive ran at an acceptable 310 RPMs.

One thing to keep in mind when using

**While the DG/1 has
no problem running
IBM PC software,
don't look for
enormous speed
from this little
machine.**

the 5¼-inch and the 3½-inch drives together is that the DG/1 treats whichever drive you boot from as the A: drive. So booting from the front 3½-inch drives makes it A:, the back 3½-inch drive B:, and the 5¼-inch drive C:. If, however, the 5¼-inch drive is your boot drive, it is called A:, the front 3½-inch drive is B:, and the back one becomes C:. Good luck keeping track of this.

Starting Up

The DG/1 boasts a handy built-in functions package that appears automatically if you forget to insert the DOS disk; you can also access it by pressing Ctrl-Alt-Cmd. (The machine does not have resident BASIC; in fact, BASIC isn't supplied with the DG/1 system.) The package resides in ROM and features four major functions. The Setup function takes descriptions of your printer and video display, if you're using a separate one, and configures your modem. You also use this function to tell

the system the number of disk drives you have. If the machine doesn't seem to recognize the 5¼-inch drive or keeps calling the front 3½-inch drive both A: and B:, check this menu; it's easy to inadvertently alter the number of drives.

The Notebook function is a simple but adequate editor that uses function keys to manipulate the text; descriptions of these functions remain at the bottom of the Notebook screen. Unfortunately, Notebook's lack of word wrap is a throwback to the days of electric typewriters: At the sound of the bell, you have to press the Return key to advance to the next line.

You use the Terminal function to set up communications when you want your computer to emulate a Data General or a Lear Siegler terminal. The BiComM-3270 from Packaged Solutions provides separate software for IBM 3270 terminal emulation.

The Diagnostics function menu tests the memory and drives. Error status codes are given at the conclusion of the tests, but the troubleshooting chapter in the manual doesn't list codes and their definitions. A Data General representative explained that since the DG/1 is not user-repairable, the code definitions are supplied only to dealers. Though most of the built-in functions are self-explanatory, a few are not. A thorough description in the manual of all functions would have made it easier to use this worthwhile package.

Compatibility, Yes; Speed, No

The DG/1 has no problem running IBM PC software. It can boot from the 5¼-inch drive, or you can download software to a 3½-inch disk. Don't, however, look for enormous speed from this little machine. (Although significantly slower than a PC, the DG/1's times are identical whether you use a 5¼-inch drive or a 3½-inch drive.) Its boot time for *WordStar* is 8 seconds, a couple of seconds slower than a floppy boot on a desktop PC. The DG/1 takes 38 seconds to read a 10-page single-spaced *WordStar* document, while an IBM PC does it in just 31 seconds. The DG/1 fin-

DATA GENERAL/ONE

ishes the BASIC prime number calculation in 87 seconds, 21 seconds longer than it takes an IBM PC. The DG/1 takes 2 minutes and 42 seconds to perform PC's

standard write test, and 1½ minutes to complete PC's read test. The IBM PC yields write and read times of about 33 seconds and 18 seconds, respectively. The

final challenge, the compatibility test in *The Norton Utilities*, gives this result: "Computing performance index relative to the IBM PC = 0.9".

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Okidata ML-93
Okidata 2410
Panasonic KX-P1090
Panasonic KX-P1091
Panasonic KX-P1092
Panasonic KX-P1093
Panasonic KX-P1160
C. Itoh 8510
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H-P Thinkjet 2225
NEC P2 Printer
NEC P3 Printer
Star Delta-10
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Star Gemini-10X
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Centronics GLP
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Cal-Abco 1200
Oxlab P10 I
Oxlab P12
Oxlab P-32
Olympia NP
Ritterman II
Ritterman 15
Ritterman Plus
Ritterman Blue Plus
Facit 4511
Siemens PT-55
Mannesmann MT-180
Printtronix MVP 150C

Internal Modem

The DG/1's internal modem is just the thing for sending data back to the office when you're in the field. The manual explicitly describes connecting the DG/1's 300-baud Bell 103A-compatible internal modem to the telephone system. It also supplies a well-annotated list of standard Hayes modem commands. Data General doesn't offer a telecommunications package such as *PC-TALK* or *CROSSTALK*, but you can download one from the 5¼-inch drive.

Printer

If you're back at the office or still out in the field, you can print your data on the DG/1's battery-operated, 4-pound thermal printer. It doesn't have its own carrying case, so if you tote it in a paper bag, it could be mistaken for a hero sandwich. Out of the bag, you might confuse it with a box of salines.

At 3 inches high, 4 inches wide, and a foot deep, this beige box is genuinely cute. It prints on smooth paper with a thermal transfer ribbon or on thermal-sensitive paper without a printer ribbon. While the draft-quality print is a little too light, its bolder print, which Data General optimistically calls "near-letter-quality," has better resolution than my Epson's draft quality character. It prints at a modest 20 to 40 characters per second.

My only quibbles with the printer concern the placement of the switches. The on/off switch is at the back of the printer under the paper roll and is difficult to reach. The other control switches and lights are on the right side of the printer, rather than on the front, so unless the printer is placed to your left, you have to pick up the printer or peer around the side of it every time you want to look at the control lights. After a few tries, I realized that I could tell whether the printer was on-line

DATA GENERAL/ONE

or off-line from the position of the print head on the platen, and I no longer had to move myself or the printer to see the lights.

The DG/1 printer is a technological hero, but it isn't fast or convenient enough to seriously challenge its big brothers.

Documentation

The DG/1's manual is also small, fitting handily into the carrying case. Except for the short shrift given to the built-in functions and the absence of the error sta-

market test. Perhaps Data General is looking to see which components people buy, and discover how and where people will use them. It can then hone the DG/1

accordingly. For now, though, the DATA GENERAL/One offers a promising start to a line of small-size, big-job personal computer systems. ■

WordStar Professional with SpellStar and 1-2-3 are among the 90 software packages available on the DG/1's 3½-inch disks.

tus codes, the manual's 150 pages are thorough and well organized. One improvement would be to move the table of contents to the front of the book instead of having it follow 11 pages of introductory material. Data General also offers a programmer's manual detailing the subsystems for applications development.

The DG/1 comes with MS-DOS Version 2.11 and a useful tutorial disk. *WordStar Professional* with *SpellStar*, *1-2-3*, and *ThinkTank* are among the 90 software packages now available on the DG/1's 3½-inch disks.

The DATA GENERAL/One is a complete personal computer system that delivers. The only question is, delivers what? And to whom? It's unclear whom Data General has targeted as the system's market. The DG/1's components vary widely in size and quality, and the system sometimes seems like a large-scale prototype or

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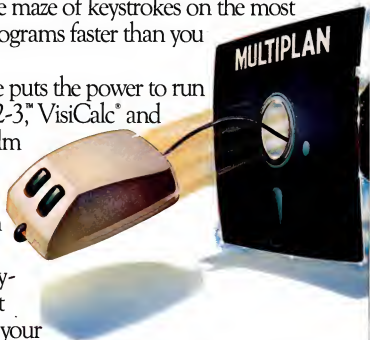
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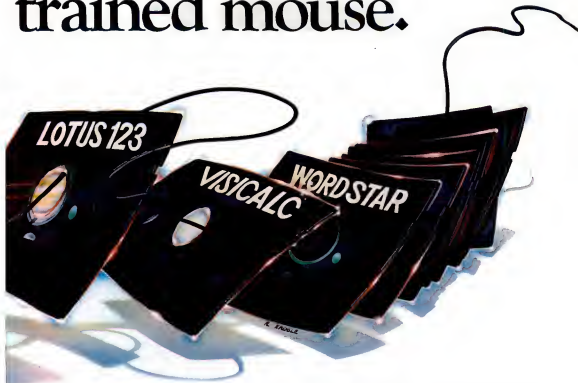
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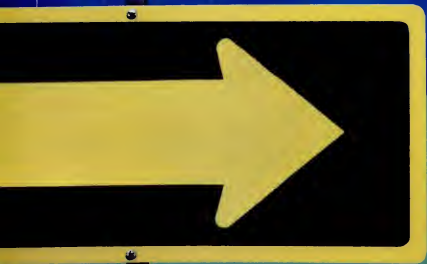
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HARDWARE • WINN L. ROSCH

The Tandy
1200HD: A
New Direction for
Radio Shack



Radio Shack's low-priced PC-XT-compatible Tandy 1200 HD introduces a name change as well as a switch to the Big Blue bandwagon. But is the low price low enough to make it a bargain?



TANDY 1200 HD

Radio Shack's new Tandy 1200 HD is the black sheep of its new family of PC-compatible personal computers—it's a near-perfect clone of an IBM PC-XT. It more closely resembles IBM's original than it does any of its siblings from Radio Shack. Where the company's other machines are cased in plastic, the 1200 HD is armor-plated like the full-size IBM line. While the Tandy 1000 and Tandy 2000 computers try, in their own ways, to improve on the basic PC theme either by cutting corners or adding extra performance, the 1200 HD seems content to be little more than a cut-rate clone of the genuine article.

The Tandy 1200 HD succeeds at its sincere flattery. It's sturdy, well made, and probably as close to the IBM standard as any non-IBM computer can get without provoking a lawsuit. It even looks more like an IBM than the average PC-compatible does.

Changes in the Wind

The 1200 HD's direct cloning marks a change of direction for Radio Shack. In the face of computer sales flattened by the IBM steamroller, Radio Shack has been forced into a revised marketing strategy that's aimed straight at the business jugular. In essence, the company has decided that if you can't beat 'em, join 'em—but undercut their price. If the compatibility is



Tandy 1200 HD

Radio Shack
One Tandy Plaza
Fort Worth, TX 76102
(817) 214-1518

List Price: \$2,999 with 256K RAM, one floppy disk drive, one 10-megabyte hard disk; \$219 for monochrome display adapter; \$299 for graphics display adapter; \$219 for VM-3 monochrome monitor; \$549.95 for CM-2 color monitor; \$89.95 for MS-DOS and GWBASIC.

CIRCLE 796 ON READER SERVICE CARD

high enough and the price low enough, you're sure to have a winner.

The company has also clearly realized that the Radio Shack name stamped on office equipment does not instill the same confidence in the typical businessperson or corporate executive that, say, IBM's does. Consequently, nearly all mention of Radio Shack and the familiar TRS-80 epithet has been removed from the name-

A compact 128-watt Astec switching supply (made in Japan) supplies the 1200 HD's power.

plates of the new machines. Together with the rest of the Radio Shack personal computer line, the 1200 HD is now a Tandy computer. In fact, the only place the 1200 HD sports the Radio Shack moniker is in the fine print on the serial number label on the back panel. Gradually, all business-oriented products formerly branded "Radio Shack" will convert to the Tandy tag. (Tandy of course, is Radio Shack's parent company.)

Of course, Radio Shack has also developed a full line of accessories—from expansion cards and monitors to genuine IBM PC programs—to accompany its new PC-compatible computers. It obviously intends to cut itself in on IBM's peripheral sales, too. That decision brings a big side benefit to the PC-compatible world: The untold zillions of Radio Shack stores are now outlets for PC-compatible hardware and software.

The Inside Story

The 1200 HD sits in a sturdy steel case with a heavyweight front-panel casing. Only one styling nuance differentiates the 1200 HD from an IBM PC-XT. Whereas the fronts of the PC and XT slope forward and down in a simple straight line, the

1200 HD sports a complex, convex, sideways "V" shape, pointing forward.

As on IBM machines, the left side of the 1200 HD's front panel is devoted to ventilation slots, while the right side has mounting positions for two full-height disk drives. These are filled (as on an XT) with a Tandon 5¼-inch floppy drive on the right (drive A:), and a Tandon 10-megabyte Winchester hard disk on the left (drive C:).

If you slide off the lid, which is secured by four screws, one in each corner of the back panel, underneath you'll find that the foundation of the 1200 HD is nearly identical to that of any full-size IBM personal computer—a sturdy stamped sheet-metal pan. Unlike the black-painted PC, however, the 1200 HD's pan is bright metal.

The functional components inside differ substantially from those of a PC or XT, however. In place of the PC's paltry 63.5-watt power supply or the XT's big 135-watt unit, a compact 128-watt Astec switching supply (made in Japan) supplies the 1200 HD's power. The on/off switch is a small rocker on the back panel, even less convenient than the PC's side mount.

The back panel also holds the speaker—which, remarkably, is pointed toward the outside world through baffle holes. It's somewhat larger than the one in an IBM machine, but still hardly hi-fi. Like the XT, the 1200 HD omits the PC's back-panel cassette port.

Another 1200 HD flip that IBM forgot involves covering the floppy drive with a screw-down aluminum panel to keep both foreign matter and interference out of the drive mechanism.

The system board itself is more compact than either the PC's or the XT's: it's only about 12 by 8 inches. The neatly laid-out XT-equivalent circuitry (complete with 8088 microprocessor) actually looks more organized than IBM's and has only a single "last minute" add-on jumper-wire correction. An empty socket is available for an 8087 math co-processor, but the board has no vacant ROM sockets.

On-board memory consists of 256K

RAM in the form of 36 64-kilobit chips, all standard. Half the chips are socketed and half are soldered. Total system RAM can be increased to 640K with an expansion card. As per IBM practice, the 1200 HD's RAM is parity-checked.

The 1200 HD uses two banks of DIP switches for configuring the system, just like the IBM PC does. (The XT has just one switch bank.) The switches are located at the very edge of the system card rather than in IBM's favored location in the middle, where they could easily be buried under expansion cards.

The big difference between the 1200 HD and an IBM-XT—and the reason I keep comparing it to a plain PC, as well as to the XT—is that the 1200 HD has only five expansion slots, all of which are full-length (a real XT has eight slots, two of which are limited to short cards). Radio Shack also equips each slot in the 1200 HD with a plastic card-guide.

The unit I tested had three of its slots filled with a diskette/parallel port adapter, a hard disk controller, and a monitor/graphics adapter, leaving only two slots for possible expansion.

To save a bit of slot-space (and some expense), an IBM-style parallel printer port is built into the disk drive adapter, in the right-most slot. Unlike the standard IBM four-drive controller, this one can apparently handle just two drives.

The next slot to the left holds the hard disk controller. Although the 1200 HD does not have the physical capacity for an additional Winchester drive, the Tandy controller can handle two hard disks.

The optional monitor adapter in the unit I reviewed was a Tecmar Graphics Tender, which is functionally equivalent to an IBM color/graphics adapter. It provides both IBM-style, direct-drive RGB and composite video output.

According to Radio Shack product manager Don White, the Graphics Tender board will also operate (with graphics) on a Tandy model VM-3 monochrome monitor, which he claims is plug-compatible with and comparable in all respects to the

IBM monochrome display. The IBM display will work with the Tandy display adapter but will not show graphics. According to White, however, Radio Shack does not recommend plugging an IBM monochrome display into the Tandy graphics adapter.

Ins and Outs

While the Tandy 1000 and 2000 use stylish keyboards with graceful curves and their own unusual key arrangement, the only differences between the 1200 HD's fingerstoppers and those on an IBM PC or XT are the typical "improvements" found in many PC-compatible keyboards.

The left-hand shift and backslash keys are reversed from the IBM standard. Both the CapsLock and NumLock keys have LED indicators to show their status. (Alas, because the LED indicators operate independently from the computer itself and get no feedback, these indicators can get out of sync and give false information.)

The ambiguous arrows that adorn all too many PC keytops have thankfully been

The Tandy color monitor rates as good or better than the IBM Personal Computer Color Display.

banished. Instead, the legends "Tab," "Backspace," and "Return" appear on the appropriate keys. The large gray plus-sign (+) key IBM includes on the far right is normal size on the 1200 HD, making room for an Enter key (which duplicates the function on the Return key). The Return key itself is the same size as the IBM standard, but its major axis runs horizontally rather than vertically.

Taking apart the keyboard reveals it to be a Hi-Tek series 725 product using hard-

contact technology. In general, this type of keyboard is less able to withstand harsh environments and has a shorter design life-time than capacitive keyboards such as those supplied by IBM and Key Tronic. Moreover, the Hi-Tek keyboard's linear feel gives no distinct tactile or audible indication of when contact has been made. Subjectively, its touch falls in-between that of the Key Tronic 5150 and the standard IBM PC keyboard. It's light but not mushy, and it seems to be an improvement over the keyboards supplied with other Tandy computers. And it's certainly more familiar to users accustomed to IBM products.

The overall fit and finish of the keyboard is a notch below those made by the industry leaders, however. This is demonstrated by the two flimsy plastic feet that allow adjustment of the keyboard angle between just two positions (the PC allows three).

On the other hand, the Tandy color monitor supplied with the unit evaluated rates as good or better than the IBM Personal Computer Color Display. Its 16 hues, counting black and white, are clear and bright, and it displays 80-column text sharply and very readably, even in color. A hidden access door under the screen affords a large measure of control over the picture, including a vertical size adjustment. You can forget the torturous groping behind the set required by IBM's control arrangement.

Installation

Installing the 1200 HD adds an additional time-consuming step to the IBM XT's process. You have to use a "low-level" formatting program to add address marks and build a file allocation table on the hard disk. IBM performs this step for you at the factory.

According to Don White, Radio Shack also performs the low-level formatting at its factory but has you go through the procedure an additional time to detect possible shipping damage and double-check that the system is operating properly.

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TANDY 1200 HD

This extra step might not seem like much of a burden until the Tandy manual informs you that this one small step is a giant leap for machinekind—and takes an hour or more. Fortunately, the instructions proved unduly pessimistic: low-level formatting actually took my test machine 36 minutes. And, since the procedure needs to be done only once in the lifetime of the

The Tandon ROM BIOS does an excellent job of achieving true IBM-compatibility.

disk drive (barring catastrophe), it is tolerable.

According to the 1200 HD's MS-DOS manual, a special *PERFORM.BAT* file is included on the DOS distribution disk. It automatically handles all the necessary hard disk installation steps, including low-level formatting. Alas, I found no sign of such a program on the DOS disk. Tandy's equivalent of IBM's *Guide to Operations*, a small spiral-bound booklet called *An Introduction & Guide*, contradicts the DOS manual and includes the proper hard disk initialization instructions.)

Following the low-level formatting, you must use a program called *PART*, the rough equivalent of PC-DOS's *FDISK*, to partition the hard disk into one or more virtual volumes. Unlike *FDISK*, which automatically reboots the system when you're finished, *PART* makes you press the *Ctrl-Alt-Del* key combination to get started again.

After partitioning, you perform a normal hard disk formatting procedure by running the *FORMAT* program. The Tandy version (standard MS-DOS 2.11) is an advance over IBM's DOS 2.0 and 2.1 formatting procedure in that the program requires you add the "switch" command (/f) after the format instruction to indicate

to the program that the "fixed" disk is the subject of your attempt to destroy data. You need not worry about blowing away 10 megabytes of irreplaceable data when you think you're formatting a floppy.

Although the Tandy manual warns that the high-level formatting will be nearly as time consuming as the low-level formatting, the DOS prompt returned less than 3 minutes after I started the procedure.

From that point on, you can pretend that the 1200 HD really is an XT. It boots from the hard or floppy disks, obeys the same commands as the XT does, and runs most of the same programs as the IBM original.

Documentation

Like IBM, Radio Shack does include DOS with the computer. Also like IBM, when you buy DOS, you get BASIC. The DOS/BASIC combination is even tighter in the 1200 HD's case because the two programs come packaged in the same box. Although they have separate loose-leaf binders, their covers are identical and they fit like Siamese twins into a common slipcase.

The Tandy's DOS manual actually seems to be an improvement over IBM's already high standard. The *Introduction and Guide* booklet explains the fundamentals of using DOS in a much more business-like fashion than the cartoon approach favored by DOS 2.1's "Big Bird." The main MS-DOS manual is equally business-like and understandable. Moreover, it doesn't just tell you what to do, but in many cases it tells *why* you must do it, explaining how computers operate in the bargain.

The lack of an index is the only serious omission in the reference work. It leaves you stuck with wading through sheaf after sheaf to find the particular nugget of knowledge that you need.

Compatibility

A major factor in determining exactly how compatible an allegedly PC-compatible computer is its BIOS, which links

software to the hardware of the system. The ROM BIOS of the 1200 HD does its best to follow in IBM's footsteps.

Unlike the Tandy 1000, which uses the BIOS designed by Phoenix Compatibility Systems and offered to the whole world willing to pay its price, the ROM in the 1200 bears the familiar name of the Tandon Corporation, disk drive maker extraordinaire. The Tandon ROM BIOS does an excellent job of achieving true IBM-compatibility. As expected, run-on-nearly-anything *WordStar* (Version 3.3) worked fine. *Framework* and *1-2-3* had no problems, nor did *dBASE II* (which encounters problems on some compatibles). *Flight Simulator* immediately took off, and the copy-protected game *Syx*, which is reluctant to run on IBM's own PCjr, ran fine.

I was surprised to discover that the disk access times of the 1200 HD's hard disk were quite different from those of an XT: it reads faster and writes slightly slower than the IBM machine. (The standard read test of 20 repetitions of a file of ten 1,024-byte records took 10 seconds; the write test took

A little haggling could eliminate most of the 1200 HD's price advantage.

40 seconds.) In normal use, however, you probably wouldn't notice the differences.

As with all compatibles, the 1200 HD cannot run IBM's BASIC or BASICA, because a portion of those programs is coded into IBM's copyrighted ROM. In compensation, Radio Shack adds a nice touch to its use of *GWBasic*. Instead of loading the language by typing *GWBasic*, as most clone-makers require you to do, you load it with either the command *BASIC* or *BASICA*, exactly as you would on a PC or XT.

Each command (*BASIC* or *BASICA*)

TANDY 1200 HD

loads a short program, then loads BASIC. No matter which name you type, you get the same language interpreter. Radio Shack's thoughtfulness will make the 1200 HD less of a bother—and save you having to rename GWBASIC yourself.

A Bargain?

The high degree of PC-compatibility offered by the 1200 HD gives it a strong advantage over the rest of the Tandy computer line. It is the one Radio Shack machine that fits into what has become the mainstream of personal computing.

Compared to Big Blue computers, the 1200 HD has a list price advantage over the PC-XT, but that's not the whole story. Some independent IBM dealers are willing to wheel and deal, while Radio Shack dealers tend to stick close to the catalog price. A little haggling could eliminate most of the 1200 HD's price advantage.

Moreover, computer-bargain hunters can obtain a lower-priced XT by equipping a standard PC with an aftermarket supplier's add-in hard disk drive. Although such machines are not 100 percent XT-compatible, neither is the 1200 HD. And although the Tandy offers a big 128-watt power supply, its limit of five expansion slots can be frustrating.

Finally, there is always the spectre of hidden incompatibility. Sometime, when you least expect it, a program won't run or your display will turn into its own version of Boy George's worst nightmare. If you stick with Tandy-tested programs, you won't have to worry, but being restricted to a small "official" program library defeats the purpose of computer compatibility.

The big decision on whether to buy a 1200 HD amounts to weighing how much that last ounce of compatibility and the IBM nameplate are worth to you.

Personally, if I were offered a 1200 HD for free, I wouldn't refuse. Moreover, were I in the market for an XT, I would consider buying the 1200 HD if I could get it at the right price. With this computer, the bottom line is the bottom line. ■

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Yes, you have some pretty nice equipment, but you've also got the "compatibility blues." For instance, Joe in the parts department has worked out a new 5-year inventory plan, and it's a 40-page document. You'd like to review it on your IBM word processor and send it back to him for a final look. But his disks won't work in your machine and vice versa. Of course, you could call each other using modems, communications packages, and two outside lines and move the text that way. Or, you could move the machines into the same room and rig up serial cables. However, either approach is going to create more hassle than it's worth.

CP/M Compatibility Blues

The Best Solution

UniForm from Micro Solutions is the solution to the DOS-CP/M compatibility blues—in my opinion, the best and least-expensive solution that is on the market. Basically, *UniForm* lets one of your PC's floppy drives emulate a drive from any one of 30 machines (see sidebar, "The Great Pretender," for a list). Of course, other utility programs enable you to format CP/M disks under DOS and copy files back and forth, but *UniForm* actually emulates the foreign drive; therefore, your applications programs can work directly with files on the alien disk. For example, you can

take a spreadsheet that was created on a Xerox 820, load the file directly into your own spreadsheet program in the B: drive, manipulate the data, and then write the file back. The disk can then be returned to the Xerox machine and be used there. No boards, no wires—just the beauty of full-disk compatibility at a modest cost (\$69.95).

Micro Solutions developed *UniForm* because the company's computer retail

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QNX is the only Multi-tasking Multi-user Operating system available for the AT. It is available in both networked and single machine configurations. At about 2.5 times faster than the QNX 8086 PC based systems, and 10 times faster than other multi-tasking operating systems on the same processor, QNX is the ideal program development environment.

Q/S	Computer	Processor	Measured time
QNX™	IBM-PC AT	80286	480 usec
XENIX™	Intel-286	80288	4,930 usec

File Security:

Designed with extensive file security features, QNX 2.0 provides login protection with network wide file permission checking based on 255 groups of 255 users. In addition, each PC user may control network access to devices attached locally to their machine.

Distributed Processing:

The QNX LAN supports distributed processing as well as distributed devices. Tasks may be executed on remote stations as easily as they may be executed on the local work station. This allows pure processing elements (PCs without keyboards or displays) to be plugged into the network to be used as an

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QNX is affordable, and will work with the PCs you use today and those you will use tomorrow. You may mix and match different brand PCs on the same QNX network with absolute ease. Multi-user expansion may be accomplished by adding terminals to PCs or PCs to the network. You can start your multi-user application on a single PC with 1 to 10 attached terminals. Once your single processor starts to show signs of degradation, add another PC and connect terminals to the new processor. If the disk becomes the major bottleneck, you may add hard disks to other attached PCs to distribute the processing. Applications which are very CPU intensive may wish to limit a single user to each processor and expand the system with low cost diskless PCs used as work stations. QNX does offer a truly cost effective and flexible solution to your applications needs.

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QNX 2.0 is portable. The operating system is independent of the physical local area network. It is available in a form suitable for porting to other 8086/8088/80186/80286 computers in the consumer, educational and industrial market place. QNX is ROMable and can operate in as little as 128Kb RAM.

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UNIFORM

outlets had a compatibility problem. The problem was initially bred by the proliferation of the 8-bit CP/M machines that came onto the market in 1980. Later, the problem became critical when Osborne dropped out of the market. Micro Solutions wanted to support its Osborne customers with Kaypro software. *UniForm* was developed for that purpose and has been sold rather informally, but quite successfully, for more than 2 years in the CP/M marketplace. The CP/M versions of *UniForm* were basically disk formatters and copy utilities. The concept of disk emulation (or translation) so applications software can directly access data files on alien disks was introduced with the new PC version of *UniForm*.

Using UniForm

UniForm is shipped on one DOS-formatted disk that is accompanied by a well-written 24-page manual. Files on the disk include *UNIFORM.SYS*, *UNIFORM.EXE*, and *FIXANSI.EXE*. The first file, *UNIFORM.SYS*, is a device driver that is installed by including the line "DEVICE=UNIFORM.SYS" in the DOS *CONFIG.SYS* file. *FIXANSI.EXE* is a patch to the DOS *ANSI.SYS* file, which must be installed to *ANSI.SYS* if that driver is active in the *CONFIG.SYS* file. And, of course, *UNIFORM.EXE* is the main program.

The heart of the system is the device driver that reads your PC's drive setup and establishes a new logical drive at the top of

The Great Pretender

UniForm lets one of your PC's floppy drives emulate a drive from 1 of these 30 machines.

This list shows the disk and machine formats that are available when *UniForm* is run on a PC AT equipped with a 1.2-megabyte drive and a 360K drive. In this configuration, the B: drive is normally used as the master drive when *UniForm* is running (see main article for further details).

FORMAT DESCRIPTION

DS:DD:48	A. B. Dick Magna III
SS:DD:48	Actrix
DS:DD:48	Actrix
DS:DD:48	Advanced Digital Super 6
DS:DD:96	Altos Series 5
SS:DD:48	Bondwell 12
DS:DD:48	Bondwell 14
DS:DD:48	BMC if800 model 20
DS:DD:48	Cal-PC
DS:DD:96	CMC Intl. Supersystem 2
SS:DD:48	Cromeco CDOS
DS:DD:48	Cromeco CDOS
SS:DD:48	Cromeco w/Intl Term CPM
DS:DD:48	Cromeco w/Intl Term CPM
DS:DD:48	Datavue DV80
DS:DD:96	DEC II
SS:DD:96	DEC Rainbow
SS:DD:48	DEC VT-180
DS:DD:48	Digilog
DS:DD:48	Direct 1025

SS:DD:96	Eagle II
DS:DD:48	Epson QX-10
DS:DD:48	Epson QX-10 (European)
DS:DD:48	Fujitsu Micro 16s
DS:DD:48	Gnat System 10
SS:DD:48	Heath w/Magnolia CPM
DS:DD:48	Heath w/Magnolia CPM
DS:DD:48	Hewlett Packard HP-125
SS:DD:48	IBM PC using CPM-86
DS:DD:48	IBM PC using CPM-86
SS:DD:48	IBM PC PC-DOS Version 1
DS:DD:48	IBM PC PC-DOS Version 1
SS:DD:48	IBM PC PC-DOS Version 2
DS:DD:48	IBM PC PC-DOS Version 2
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DS:DD:48	IMS 5000
SS:DD:96	IMS 5000
SS:DD:48	Kaypro II
DS:DD:48	Kaypro 4
DS:DD:48	Kaypro 10
SS:DD:48	Lobo MAX-80
DS:DD:48	Magic Computer
DS:DD:48	Micron Quark
SS:DD:96	Monroe
SS:DD:48	Morrow MD2
DS:DD:48	Morrow MD3
DS:DD:48	NCR Decision Mate V
SS:DD:48	NEC PC-8001

(continued)

PD

UniForm, Version 1.0

Micro Solutions Inc.
Software Products Div.
125 S. Fourth St.
DeKalb, IL 60115
(815) 756-3411
List Price: \$69.95

Requires: 128K RAM, two floppy disk drives or one floppy disk and one hard disk, DOS 2.1 or higher.

CIRCLE 797 ON READER SERVICE CARD

the drive list if you have dual floppies or dual floppies and a hard disk drive. Otherwise, the *UniForm* drive is installed in the B: drive. This automatic logical drive assignment can be forced if you have other drivers that automatically assign drives. In any event, one of your floppy drives develops a split personality. In normal operation under DOS, the appointed floppy behaves as usual. However, when *UniForm* is run, that drive gets a new letter designation and reads and writes in its newly assigned format.

It's very easy to invoke *UniForm*. When you type *UNIFORM* at the DOS prompt, you are presented with a menu of possible formats for the *UniForm* drive. *UniForm* can sense the configurations of your machine and adjusts the list to add formats according to the drives you have installed. (For example, *UniForm* adds 8-inch formats to your list if it finds an 8-inch driver card in your system.) You simply select the format you want, and the DOS prompt reappears. From then on, the *UniForm* drive reads and, in most cases,

UNIFORM

writes to the *UniForm* drive in its new format. All the familiar DOS commands and applications programs work as usual because they "think" that they are looking

at an ordinary MS-DOS drive.

I tested *UniForm* on a PC with two double-sided, double-density drives and on an AT with a 1.2-megabyte floppy

drive, a 380K floppy drive, and a 20-megabyte hard drive. The target machines included an Epson QX-10 running CPM 2.1, the same machine using an MS-DOS board, and a Kaypro. For simplicity, I transported *WordStar* files in all possible directions. All disks were written from and read to by all combinations of machines. *UniForm* worked flawlessly.

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Interesting Possibilities

I found that using *UniForm* on a PC AT presents some interesting possibilities if you have the optional 48-track double-sided, double-density drive in addition to the standard 96-track high-density disk drive. Micro Solutions says the optional drive is "highly recommended for full use of *UniForm*'s capabilities." When the AT is equipped with only the high-capacity drive, *UniForm* uses it to read, write, and initialize disks from the machines on the list that use the 96-tpi format. (These disks cannot be initialized with a standard PC.) If you select a 48-tpi CPM disk, and you don't have the optional drive, *UniForm* sends a "Read only" notice to the screen

UniForm does nothing to the data in the file itself. It primarily moves data around.

and refuses to write to the disk. If, on the other hand, you have the optional 48-tpi drive installed, *UniForm* automatically uses that drive when you specify a 48-tpi disk format.

Alien Formats

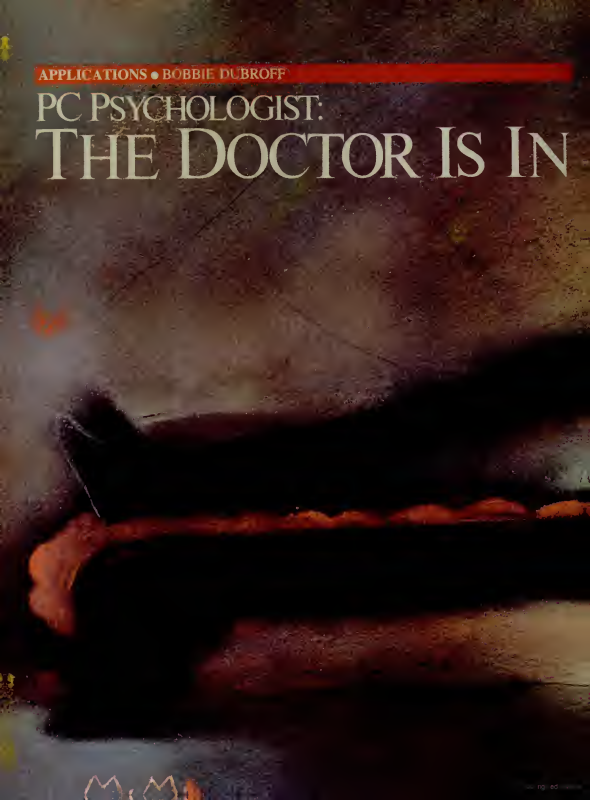
You'll find that some alien disk formats simply won't be able to work with *UniForm*. Basically, the disk controller must be compatible even though the disk formats are not. For example, hard-sectored formats are out. Some unlisted formats will work but only if the other machine's


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CIRCLE 386 ON READER SERVICE CARD

APPLICATIONS • BOBBIE DUBROFF

PC PSYCHOLOGIST: THE DOCTOR IS IN



A surrealist painting by Elizabeth von Heubner. A woman with long dark hair lies in a light-colored, upholstered chair. She is plugged into a standard two-prong electrical outlet on the dark red wall. A thin white cord connects her back to the outlet. The scene is dimly lit, with a strong light source from the left creating a bright glow around the woman's head and the chair's backrest. The overall mood is mysterious and evokes themes of technology, psychology, and human-machine interaction.

Computerized testing may sound cold and calculating, but psychologists report that many patients actually prefer confiding in a machine.

You're ushered into the inner office of the clinic. The door closes behind you. Your ears buzz with the omnipresent hum of the air conditioner. Your head spins. Looking around, you shrink from the strange, gleaming medical instruments and machines.

Your eyes are drawn to the brightly illuminated area behind the sliding glass doors. There, enclosed in an airtight environment beyond the No Smoking sign, you find comfort in the silent presence of the computer. You sit at the terminal and take a deep breath.

H-E-L-L-O, the message sweeps soundlessly over the black screen. Push a button and suddenly words and sentences materialize on the screen, like silent interrogators patiently awaiting your response. You have a choice: TRUE or FALSE. And as soon as you've answered one question, a new one appears.

You begin to relax; your responses grow automatic. The computer wants to know all about you. What careers appeal to you? How is your sleep? What do you dream about? Any physical complaints? How are your bowels? Your urine? Do you have headaches or dizzy spells? This is a curious machine. It asks about your mother and father, your religious experiences, your attitudes.

Each of the 550 statements that flash past hurls you deeper into an intimate relationship with the questioner. Your defenses dissolved, you spill the family secrets and end up discussing everything from your drug and alcohol consumption to your sex life—intimate details you may never share with another human. All the while your computerized confidante is quietly recording them.

"Beep-beep." The test is over. At 180 characters per second, your life, your fears, and your sins take shape in the print-out in the doctor's hand. The computer has captured your innermost thoughts and feelings. But now they're on paper, for human eyes to see. The doctor peers

Mind Prober: In Search of the Real You

Mind Prober evaluates personalities and gives you a complete picture of yourself and others. Or does it?

Who is the person inside each of us? Is it what we believe we are, how we appear to others, or an entity distinct from either? To find an answer, I spent a few days probing the *Mind Prober*.

The *Mind Prober* is "a personality evaluator that enables you to read people in your professional and private life," says the Human Edge Software Corporation. Its author, Dr. Kathy Johnson, says the *Mind Prober* "increases understanding of other people." But does it?

The *Mind Prober* asks you the name, sex, and age category of the person you want to probe, displays a list of 65 descriptive words, and asks whether these words apply to your subject. You type A for agree and D for disagree. The program then analyzes your answers and produces a three-page report on your subject, which analyses: "Relationships," "Attitudes Towards Work," "Coping With Stress," "Attitudes Towards Sex," and "What Makes (your subject) Tick."

My first test was a mind probe of a personal friend. After I answered the 65 true/false questions about him, the program printed out a profile that seemed very accurate. However, I next did a probe on myself, and surprisingly, my

own report was almost identical.

More problems emerged when I decided to compare two mind probes of a PC staffer. I did one probe of him, and he did one of himself. The resulting profiles were as different as could be. As a further test of reliability, he decided to have two additional mind probes done: one by his wife and the other by a close friend. These last two probes turned out almost identical, and very different from the first two. Did his wife and friend understand the "probee" better than he understands himself? The *Mind Prober* can only lead you to speculate.

The *Mind Prober* profiles correspond to your own feelings about the person you want to evaluate because what you key in supplies the data for the program's report. The *Mind Prober* provides insights that may not have occurred to you, but they are merely the results of the programming coded into the software to help you "integrate and structure your impressions into a complete picture of another person." The so-called complete picture is completely based on your personal impressions of whomever you are probing.

Those of us on the PC staff who tried the program unanimously agree the *Mind Prober* is a fun program rather than a reliable testing device. The science of understanding another person is far too complex for any tool to claim to accurately "read" an individual based on the answers to 65 true/false questions.

The *Mind Prober* would make great party entertainment—but the program isn't sophisticated enough to answer the question "Who is the real you?"

—Rox Tobias



Mind Prober

Human Edge Software Corp.

2445 Faber Pl.

Palo Alto, CA 94303

(415) 493-1593

List Price: \$49.95

Requires: 128K RAM.

CIRCLE 696 ON READER SERVICE CARD

through reading glasses at the test results. The report begins.

Fast Freudians

Computers that shrink heads are no longer the futuristic visions of over-imaginative authors and movie makers. More than 250 such systems are already in operation in hospitals and psychiatrists' offices across the United States. They've taken over some of the duties once performed by the psychologist. One of their major tasks is to administer, score, and interpret tests used to diagnose personality disturbances, measure intelligence, and help make vocational decisions.

In 1972, Psych Systems, a Baltimore, Maryland, software firm, turned that job over to the machine. With their new program called *Fasttest*, a computer can administer 26 psychometric tests, including today's most sophisticated and widely used diagnostic tools, notably the Minnesota Multiphasic Personality Inventory (MMPI), the California Personality Inventory, and the Rorschach Interpretation.

Initially *Fasttest* was available only on DEC's LabSystem 50 as a multiterminal system that sold for approximately \$32,000. Psych Systems expanded the system using other DEC hardware, including the Pro 350, a hard disk drive system with a microcomputer and a single terminal, priced at \$16,000. And, as of March 1, 1984, *Fasttest* is compatible with the PC-XT, at a price of \$14,000. The firm also offers physicians portability; the same battery of psychometric tests is available on the Compaq, which can be carried to the patient's bedside, like the physician's traditional tool of the trade, the black bag.

"We have IBM and IBM-compatible micros tagged for the major portion of our revenue for the coming fiscal year," says a confident William Brettschneider, microcomputer product manager at Psych Systems. He explains, "When a customer who is not computer literate considers spending \$6,000 or \$8,000, he or she gets nervous." The reputation of the PC-XT

and the large selection of third-party software available for it persuade the clinician to invest. The added flexibility of doing word processing or billing with it makes the PC-XT a popular prescription.

A psychologist who works primarily with children and families, Dr. Kenneth N. Condrell of Williamsville, New York, agrees. He bought *Fasttest* on a DEC LabSystem 3 in 1982. He found the system to be inconvenient and awkward, but he never intended to make a switch. Then, last year, Condrell began to shop for an office billing system. The PC-XT was one of those recommended. When Condrell discovered from Psych Systems that he could kill two birds with one computer, he jumped at the chance. Two months ago he bought the IBM. "It's an easier, more

With *Fasttest*,
a computer can
administer 26
psychometric tests,
including today's
most sophisticated
and widely used
diagnostic tools.

user-friendly, system," says Condrell. "The DEC could not be used for anything else—it was limited to administering tests."

Good Value for the Price

Computers have been scoring psychometric tests since the advent of answer forms, black boxes, and number-2 pencils, though historically it's been the job of the professional psychologist to integrate those scores and offer possible diagnoses. Now, according to Psych Systems, the computer is not only faster and cheaper, it's better.

Psychiatrists Dr. Burton T. Mark and

Dr. Ned Baron of Psychcomps Evaluations, in West Chester, Pennsylvania, concur. In 1981 the pair purchased *Fasttest* on a six-terminal LabSystem 50, the first, they claim, in their Pennsylvania-New Jersey area.

Testing by the computer is faster than by the psychologist, according to Dr. Mark. "It takes 3 to 4 hours for the psychologist to collect the data, a couple more to score and interpret. Then the report must be written. In the past we often waited 10 days to see the final product. And it was costly. Because he or she has a Ph.D., a psychologist is financially well compensated for that time."

This assessment is corroborated by Goldine Gleser, psychologist at the University of Cincinnati and spokeswoman for the American Psychological Association. A standard battery of tests given by a psychologist can cost between \$300 and \$800, depending on the number and complexity of the tests administered. Psychcomps Evaluations's electronic brain in West Chester or any one of its terminals from Downingtown, Pennsylvania, to Pennsauken, New Jersey, however, can do the job for \$300 within 2 hours, with the report written the following day.

Superior Tester

The enthusiasm at Psychcomps goes beyond the speed and efficacy of their electronic ego evaluator. The heart of the issue is that the doctors believe that the computerized evaluation may be superior to those of its human counterparts. The revolutionary idea at the base of this perception is raising some psychiatrists' eyebrows.

For the first time in history the computer acts as the test giver. This innovative concept is just entering its infancy in psychometric circles. And except for the work of the people at Psych Systems, little has been done in the area of research. But if research is scarce, opinions are not.

"Psychologists can never be as objective as a computer," says Dr. Mark. "They automatically inject their own per-

sonalities into the collection of data and the interpretation of results. Think about it. A computer can't yawn or look bored. It can't tap its pencil. It can't be abrasive or endearing. Behaviors like that subtract from the objectivity of the testing experience." And, as Mark points out, some people find the computer a lot less threatening than a human being. He cites the adolescent who has difficulty with authority figures as one example.

Dr. Paul Fink, past president of the Philadelphia Psychiatric Society and former chairman of the department of psychiatry at the Albert Einstein Division of the Montefiore Medical Center in the Bronx, New York, initially was concerned about this concept. "It has not been adequately researched; I need more information," said Dr. Fink when he first heard about the concept. "But I am personally skeptical of a computerized system that universalizes the diagnostic procedure. I think social scientists should be the last to get involved in anything that dehumanizes either diagnoses or treatment."

But after Dr. Fink had seen the computer at work, his tune changed somewhat. "I think it can be a very useful tool when combined with clinical expertise," he now says. "But it should never be used unidimensionally. If it's used as a laboratory test, as only a piece of the entire diagnostic system, it can give the doctor greater efficiency."

Persuasive Research

Changing the opinions of concerned clinicians like Dr. Fink is the challenge the sales force at Psych Systems faces. The software firm, which has recently gone public, has come a long way since 1972, when it began to grow from a germ of an idea in the fertile mind of psychologist Dr. James H. Johnson.

"I was concerned that people coming into the hospital weren't being evaluated properly," Johnson says. "Too many were admitted without reason. Too many were sent back into the community without follow-up. The evaluation process

consisted of a 15-minute interview. Then the psychometric tests took several days. Without them we had no conclusive way to gather information."

In hospitals, doctors must work under constraints imposed by insurance companies. Most patients won't be reimbursed for the part of their stays that extend longer

"Psychologists can never be as objective as a computer. They automatically inject their own personalities into the collection of data and the interpretation of results."

than 14 to 21 days, Johnson explains. "Considering that the testing process was taking 10 to 11 days, we weren't left with very much treatment time. Using the computer, we could cut our evaluation time all the way down to 3 days, leaving 11 days for the therapy."

Longer therapy time in itself was enough to enhance the success of treatment, but Johnson's research further indicated that patients prefer being tested by computer; 80 percent reported that with the computer, they were more honest, more free to respond. And the users and creators of the new technological testers have made more promises about the computer's expertise. According to Johnson, the machine outperforms the man in yet another area—intelligence.

Computer systems have memories that are superior to those of mere mortals. No one person could ever remember all the details required to interpret some of the

tests used today. A case in point is that of the MMPI, one of the most popular personality tests currently available. It has helped doctors to diagnose degree and type of mental illness since 1951. A patient's responses to the MMPI's questions help the psychiatrist determine whether he or she is the mild neurotic who builds castles in the sky or the extreme psychotic who lives in them. Currently some 6,000 references in the literature discuss how to interpret the patient's answers. "An expert can't possibly remember them all," said Johnson, "but a computer can." One reason a machine can be so knowledgeable is that Psych Systems constantly reprograms the system with research information updated by experts in the field. For every test they have an expert.

If the psychiatric superbrain proves to be nearly as successful as its supporters hope, it won't be long before every psychiatrist on the block has one in the office. To remain a step ahead of the competition, the doctors at Psych Systems are already marketing the services of their computer. In addition to seeking business from the mental health professions, they hope to sell their services to large corporations for help in evaluating personnel and particularly to members of the legal profession for help in analyzing issues of sanity.

The one drawback seems to be how that information is used. "No doubt the computer has the potential to give us more information faster than ever before," says APA's Gleser in reference to using computer results in the courtroom, for example. "My concern is that the public may regard such information as absolute. It is not. And even if it were, the tests themselves are imperfect. The interpretations don't hold for every individual. I would like some assurance that there will be safeguards."

The watchword seems to be that computers are experts on analyzing data but that the human element is still important. The doctor's bedside manners and the lawyer's wise counsel are not outmoded—yet.



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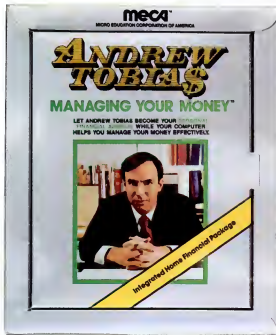
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CIRCLE 151 ON READER SERVICE CARD

Breaking the Memory Barrier

A flexible addressing system called bank switching adds massive amounts of memory to ordinary PCs, allowing them to do jobs once too big for anything but a mainframe or a mini.

Imagine for a moment that you could put 2, 4, even 16 megabytes of RAM in an IBM PC. What could you do with that much memory?

With many megabytes of RAM in your PC, you could sort a multimegabyte database in one-fifth the time it takes with a hard disk. Your slow text editor would fly like the wind. You could watch smooth, detailed, flicker-free, real-time animation and graphics, listen to minute after minute of high-quality, continuous synthesized speech or music, or train a virtually unlimited expert system or artificial intelligence program. You could divide up the computer's time among several users or concurrent programs, giving as much memory to each user or program as you now use for a single job. Programs and operating systems like UNIX would no longer be bogged down by time-consuming disk access but could run at high speed from as large a RAMdisk as you need. Jobs that were once too big or too time-consuming to run on anything less than a mini or a mainframe would suddenly be within the reach of affordable personal computers.

But why just imagine? The IBM PC and compatibles are no longer limited to 640K of RAM. Two companies, Tall Tree

Systems of Palo Alto, California, and Datatron, of Tustin, California, are now offering special memory boards that use a flexible addressing scheme called "bank switching" to put up to 16 megabytes of RAM in a single PC. Other companies should be entering the market soon. Big memory dreams are no longer fantasies—they are practical realities.

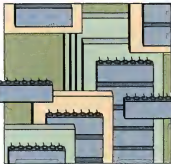
The 640K Barrier

The 8088 microprocessor in the PC can address a total of 1 megabyte of ordinary RAM. This is a hardware limitation inherent in the microprocessor itself. The 8088 has 20 memory "lines," each of which has two possible states, and 20^{20} equals

1,048,576 possible locations. IBM has chosen to further reduce the amount of memory available to users by making 360K of the possible 1 megabyte "reserved." Part of this reserved block of addresses is occupied by the ROM that boots up the computer and handles most of its low-level I/O functions. Another part is occupied by the memory that holds the image on your display screen. However, much of this reserved address space is not used for anything at all but is kept unspecified for future developments.

You can think of all the possible addresses that the PC can generate as making up an "address space." This address space is broken up into 16 blocks, or "address pages," each of which is 64K long. The first 10 address pages (0 through 9) are available to the user for a total of 640K. The remaining 6 address pages (A through F) are reserved. Figure 1 illustrates the address space.

Ordinary memory generally comes in "banks" of 64K, made up of nine chips. When you install a bank of RAM, you set a switch on the computer's motherboard or the memory board that specifies the address page to be filled by those chips. A single bank of ordinary RAM occupies one and only one address page. When you



THE MEMORY BARRIER

have filled up all 10 available address pages, you cannot add any more RAM banks. That is the 640K limit.

Bank-Switched RAM

Bank-switched RAM is different. Unlike ordinary RAM banks, switchable banks are not permanently assigned to particular address pages. Instead, each bank of switchable RAM can be assigned to any address page, or to no address page, by a single assembly language command. With ordinary RAM, each bank permanently fills up a page of addresses. With switchable RAM, each bank can be switched in or out of any unoccupied part of the address space as it is needed. This method allows a large number of RAM banks to make use of the limited number of address pages. Switchable addressing opens the door to virtually unlimited high-speed memory.

A single computer can have dozens of switchable RAM banks with no addresses at all. When a program wants to read or write a particular bank, it commands the bank to appear at any convenient address page. The program can then read from and write to the bank exactly as if it were ordinary memory permanently installed in that address page. When the program is done with that bank, it can send it back into no-address limbo and call up another bank. When the program calls the first bank back, whatever was stored in it will still be there.

Figure 2 illustrates a single switchable bank appearing in address page 9. Any other switchable bank could appear in that address page just as easily, or in any other address page not already occupied by a permanent bank of ordinary RAM.

At any given instant, the com-

puter can still address only 640K of RAM. But with switchable banks, that 640K of addresses can be occupied by different banks of RAM, depending on the task the program has to do at that moment. For some applications, it is simplest to switch one bank at a time in and out of a set address page. For others, many banks can be switched in or out at once.

Why go to all this trouble? Because, no matter how complicated it may sound, bank switching is fast. In the time it takes a program to execute the single command that makes a bank appear in an address

page, 64K of data is available for direct memory access by the program. Compare that to retrieving data from even the fastest hard disk: The program has to issue a command to DOS, DOS has to call its ROM routines, the hard disk drive has to position its head, and finally the data has to be transferred to an available area of RAM. For any application that involves accessing a lot of data, bank switching beats any other storage scheme hands down.

Bank on It

The most obvious way to use bank-switched RAM is as a RAMdisk. A RAMdisk is a section of RAM set up by a special program to emulate a hard disk or floppy drive. Any software that runs from a physical disk drive can run from a RAMdisk, with two important added advantages: increased speed and capacity.

Since RAM is so much faster than mechanical storage media, a program running from a RAMdisk can run up to 5 times faster than from a hard disk, and up to 50 times faster than from a floppy drive. These figures vary because different programs involve different amounts of disk access. A database program that frequently accesses scattered parts of a large data file will show a tremendous gain in speed, while a spreadsheet that never accesses a drive at all will gain nothing from a RAMdisk.

Most people who have purchased multifunction and memory boards are familiar with RAMdisks based on ordinary memory. The RAMdisk programs that come with many ordinary memory boards typically offer RAMdisks of up to several hundred kilobytes: about enough to hold as much as a single floppy disk. But with bank-switched memory, you can have the speed

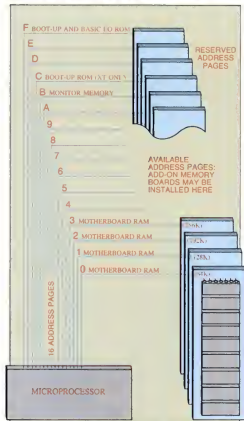


Figure 1: The XT's address space with 256K RAM; a PC would not have the ROM installed on page C. More memory could be installed in pages 4 through 9 with an add-on board.

of a conventional RAMdisk plus the capacity of a hard disk.

For example, Micro-MRP of Foster City, California, maker of an inventory control package by the same name, uses a 6-megabyte bank-switched RAMdisk to hold its inventory programs and the data they work with. Operations that used to take a week with a hard disk system run overnight from the RAMdisk. Users of IBM's *DisplayWrite II* text editor have discovered that they can put all 600K of the program (delivered on five separate floppy disks) on a single bank-switched

RAMdisk, with plenty of room left over for long documents and other programs. The user never has to swap disks to use any feature of the program. More importantly, if the package is run from a RAMdisk, the otherwise slow *DisplayWrite II* becomes fast and convenient, without any sacrifice of features or software modification. Even *WordStar* seems peppy when it runs from a large RAMdisk.

Disk-based graphics packages like *Artwork*, by West End Film in Washington, DC, can create, rotate, distort, modify, and color professional-quality, high-reso-

lution, shaded color graphics with a minimum of waiting with a large RAMdisk. For the more technically inclined, CAD systems make the same enormous speed gains when running from a large RAMdisk. Compared to the cost of the software and specialized display and printing hardware required by this kind of system, the cost of one or more bank-switched memory boards is insignificant, yet the gain in speed is spectacular. You can expect more of these specialized packages to be offered with bank-switched RAM disks.

As generalized, easy-to-understand,

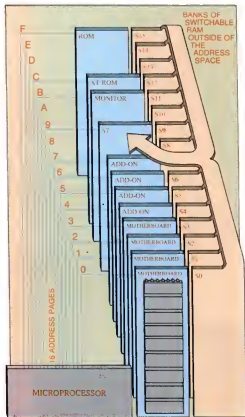


Figure 2: A single switchable RAM bank appearing on address page 9. Address pages 0 through 7 are permanently assigned. Any of the banks on the right can go into any of the open slots.

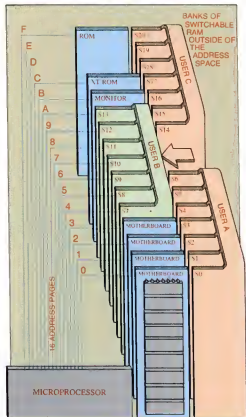


Figure 3: Multitasking with switchable RAM. When User B's time share is over, the program switches the available memory to User C's partition. This way each can have a large enough block.

THE MEMORY BARRIER

and powerful as a bank-switched RAM-disk is, it is only the simplest use of switchable RAM. The greatest power of bank-switched memory lies in other, more-specialized applications.

Putting up Partitions

Consider multi-user and multitasking programs, for example. Without bank-switched memory, each task or user has to make do with a fraction of the 640K in the machine. With two users, each can have no more than 320K to work in; with three, each can use only 210K. Handling more than three users or jobs is generally out of the question. But with bank-switched memory, each user can have his or her own partition of up to 448K (seven banks), plus the shared use of programs such as DOS and the multitasking program itself located in the ordinary RAM permanently installed on the motherboard. When User A's slice of computer time is finished, all seven banks of A's memory partition can be switched out into no-address limbo, and User B's seven banks switched in. Each user or task has a full-power PC to work with, not just a third of one.

Figure 3 shows such a block of seven switchable banks appearing at once in the address space. The size of the switchable partition is limited by the number of ordinary RAM banks that permanently fill up the first few address pages.

Or consider the field of animation and graphics. With bank-switched memory, a graphics program can have an enormous library of high-resolution images stored in switchable banks. Each image can be called up in almost no time. A clever hardware/software combination could even have banks switch directly into the address page used by the display screen. With enough switchable RAM, a program could easily recreate smooth, high-quality animated scenes in real time.

Exactly the same logic makes switchable memory ideal for speech synthesis applications. With some systems, it takes roughly 4K to hold 1 second of encoded speech sounds. With a few hundred kilo-

bytes required by the speech synthesis program itself, a PC will run out of ordinary memory before it has uttered 2 minutes of speech—a pretty short sales talk by most standards. But with bank-switched memory, a program can call up bank after bank of stored speech with virtually no access time. Charles Schwab, Inc., of San Francisco, California, is currently developing a PC package that uses several megabytes of bank-switched memory to talk on eight phone lines at once!

And then there is the up-and-coming operating system, UNIX. UNIX is based on enormous numbers of small files. If all those files are on a hard disk (or, even worse, a diskette drive), then UNIX is very slow; if they stay in ordinary memory, then even a simplified version of the operating system does not leave very much space for holding programs or data. Bank-switched memory makes possible a UNIX that would be both fast and full-featured, without the restraints of limited memory space.

With memory to spare, you have a whole new outlook on programming. Instead of spending time and money on memory-optimized code, you can write simple programs that are frankly inefficient with memory. For example, a data-

base program can organize its data in 64K "cells," each corresponding to a bank of switchable RAM. Each cell can have the same internal structure, leaving lots of space for adding data within the cell and correspondingly wasting part of each cell's storage capacity. The program can then swap cells in and out of a set address page. Since each cell has the same structure, the program can access any cell's contents in the same, stereotyped, simple-minded way—which can involve many fewer steps than a more memory-efficient algorithm. This kind of programming gains speed both from eliminating disk access time and from using simpler code, while costing less money and time to develop.

Having a lot of memory means programs can save more time by looking up values instead of calculating them. Since memory is no longer a precious commodity, programs can be table oriented. Some recent work at Princeton suggests that ordinary microprocessors using memory-intensive software can rival elaborate parallel processing systems for speed.

There are countless other applications for bank-switched memory. Artificial intelligence and expert systems work, print spooler buffers, enormous spreadsheets, integrated software, and windowing systems are just a few. Some of these applications already exist or are being developed; others are still up for grabs.

But Is It Practical?

Having megabytes of bank-switchable RAM sounds like lots of fun, but who can afford it? Who wants to take up all their expansion slots with memory boards? And surely having that much RAM will overwhelm a PC's power supply and cooling fan, right?

Wrong. Unlike other "innovations" in personal computing, bank-switched RAM is practical. Bank-switched memory typically costs only 10 to 20 percent more than ordinary memory, although you have to buy more of it to gain any benefits. Bank-switched memory uses no more power than ordinary memory—only about 3



JRAM-2

Tall Tree Systems
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Palo Alto, CA 94303
(415) 964-1980

List Price: bare board, \$219; 512K,
\$320; 2MB, \$1280.

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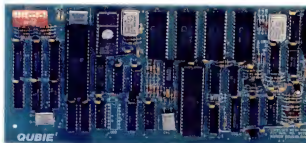
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Datatron Inc.
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Tustin, CA 92680
(714) 832-0691

List Price: bare board only (chips not
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watts per 512K or 2-megabyte board. And unlike some display boards and other power-consuming add-ons, memory boards simply do not get hot.

As for using up expansion slots, there is a problem. Using ordinary 64K chips, a megabyte of switchable RAM takes up two slots. Using the new 256K chips, you can pack a full 2 megabytes of RAM onto a single board with roughly the same power consumption and heat characteristics of a single board of 64K chips. But these ultra-compact chips still cost more per byte than 64K chips, although their prices are dropping so fast that they are expected to cost the same per byte as 64K chips in a matter of months. By using piggyback boards, some bank-switched memory boards can compensate for the slots they take up by offering various I/O ports, a clock, or even a disk controller that fits on top of the memory board, freeing a slot that would otherwise be used for a multi-function board or disk controller board.

Boards capable of holding up to 2 megabytes of bank-switched memory, accompanied by RAMdisk, disk caching, and print spooler software are available now. Major corporations, including the leading manufacturers of personal computers, are using bank-switched memory boards by Tall Tree Systems right now in 4- and 6-megabyte systems. Multitasking and multi-user software packages, including the popular *Multilink*, *Multijob*, and *Double-DOS* systems, are currently being modified to use Tall Tree's bank-switched memory.

The 2Megaboard by Datatron and the JRAM-2 by Tall Tree Systems are the two bank-switched memory boards currently on the market (see the Fact File). Not surprisingly, they use two different approaches to controlling the banks. The problem is the same for any bank-switched memory board: Programs must be able to command the board to make some specified bank appear in some specified address page. Moreover, there may be more than one bank-switched memory board in a system, so the command has to specify which

of the boards it refers to.

To send a command to the Datatron board, a program issues an I/O command that sends a byte of data to the board as though it were an output device like a printer or a modem. DOS sets aside a block of addresses in address page 0 that is

address, and from there it goes out to the printer connected to that address.

When you install a Datatron board, you assign it to a block of eight I/O addresses. If you had more than one Datatron board, you would assign the boards to different blocks of I/O addresses so that each board

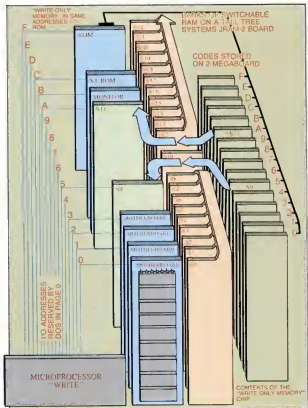


Figure 4: The Datatron 2Megaboard switches banks of RAM memory in and out of the PC's address pages by commands sent through a block of 8 I/O addresses, which are themselves located on address page 0.

reserved for I/O device addresses. To print a byte of data, for example, an assembly language program can issue an OUT (output) command and specify the address to which the printer is assigned. The computer will write the byte to the specified

could be controlled independently. Each of these I/O addresses come to stand for one of a contiguous block of eight address pages in which the RAM banks on the board can appear. The block of address pages can be set to start at any page.

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ff5150 \$129

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You would never want to make a switchable bank appear in an address page that is already occupied by ordinary RAM or by another switchable bank, because the result would just be garbled data in that page. For example, as shown in Figure 4, if you have 256K, or four banks, of ordi-

address page 4, the second for address page 5, and so on.

The Datatron board, like the Tall Tree Systems board, can hold up to 32 banks of RAM by using 256K chips, which squeeze four 64K banks into the sockets normally required for one 64K bank. The

addresses. To make a different bank appear in address page 4, the program would simply output the new bank number to the first I/O address. The bank that used to be in page 4 would get bumped out into no-address limbo, and the new bank would appear there.

The Tall Tree Systems board uses a trickier technique. To send a command to a Tall Tree System board, a program writes a byte of data to an address in one of two reserved address pages. One of these reserved address pages, page F, has ROM installed in it, as seen in Figure 5. This ROM contains the boot-up programs and the basic I/O programs that are used by DOS and most other programs. The other address page, page E, has nothing installed in it but is reserved for some unspecified future ROM.

The Tall Tree Systems board has on it what amounts to a "write-only" memory chip. The data stored in this small memory chip control which banks on the board appear in which address pages and which do not appear at all. The computer can write data to this chip, just like any other, by specifying the correct address. However, the computer cannot read the data stored in the write-only memory—only the control circuitry of the Tall Tree Systems board itself can tell what is stored there.

When you install a Tall Tree Systems board, you assign the write-only memory chip to address page E or F—addresses already or potentially occupied by ROM. You also assign it an identifying number from 1 to 4, so up to eight boards in a system can be controlled independently.

A program sends commands to the Tall Tree Systems board by writing data to the address of the write-only chip. This address also happens to be occupied by some memory location in ROM. So, when a program sends a command to a Tall Tree Systems board, the computer tries to write the data on both the write-only memory chip on the Tall Tree Systems board and the memory location in ROM that shares the same address. Since ROM is permanent memory, the data in the ROM is unaf-

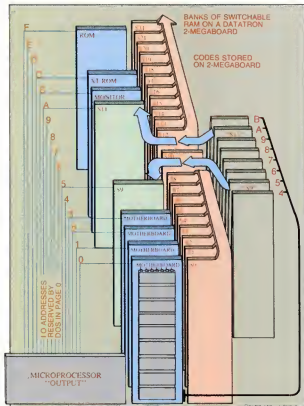
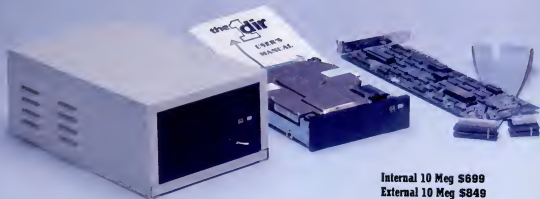


Figure 5: The Tall Tree Systems JRAM-2 board uses a special "write only" chip that is readable only by its own control circuitry. The chip shares address space on page E or F with IBM-reserved ROM.

nary RAM installed, address pages 0, 1, 2, and 3 are permanently occupied by ordinary RAM. You would set the block of address pages represented by the eight I/O addresses to start at page 4. In other words, the first I/O address would stand for

Datatron board identifies each bank on the board with a number from 0 through 31. Continuing the example above, to make the first bank on the board appear in address page 4, a program would output the number 0 to the first of the eight I/O

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fected. The computer does succeed, though, in writing the data on the write-only chip at the same address. The Tall Tree Systems board reacts to the new contents of the write-only chip by making the desired bank appear in the specified address page.

Conversely, when the computer tries to read the data stored at that shared address, it reads only what is stored in the ROM. As far as reading data is concerned, the write-only memory might as well not exist. So, when the computer writes to the shared address, it writes only to the write-only memory; when it reads from the shared address, it reads only the ROM. This scheme allows programs to communicate with the Tall Tree Systems board without the board itself taking up any address space at all and without any risk of conflict with I/O devices, other operating systems, or other software.

The actual commands that control the Tall Tree Systems board are rather tricky, too. The write-only chip on each Tall Tree Systems board has only 16 memory locations in it. These 16 memory locations stand for the 16 address pages, just as with the Datatron board the 8 I/O addresses stood for 8 address pages. The eight write-only chips allowed in one system a total of only 128 memory locations. Yet they are the only writable memory installed in 2 whole address pages, which comprise 128K addresses. A command can specify the desired write-only chip and the desired location within it using just a few digits. The rest of the address digits are superfluous. They are available to be used, in effect, as data digits.

To command a Tall Tree Systems board to make a particular bank appear in a specified address page, a program writes a byte of data (two hexadecimal digits) to an address in page E or F. When a program writes data to an address, it writes two hexadecimal digits to an address specified by eight hexadecimal digits. For example, a program might write the data 7B to the address 48C2:036A.

In the special case of a command to a

Tall Tree Systems board, the first two digits of the address are sufficient to specify which write-only chip the command concerns. Remember that there are four write-only memory chips in each of the two address pages E and F. The write-only chips are connected in such a way that a command sent to any address starting with the digits F2, for example, is recognized

The commands that control the Tall Tree Systems board are tricky.

only by write-only chip number 2 in address page F.

The two data digits are almost, but not quite, sufficient to specify the remaining information. The *second* data digit specifies in which address page the desired RAM bank will appear (0 through F). Since the write-only chip has one memory location for each address page, this second data digit is in fact functioning as an address, specifying which memory location in the chip will hold the number identifying the bank that will appear in that address page.

The *first* data digit partially specifies which RAM bank on the board will appear in that address page. But since there are only 16 possible values of a single hexadecimal digit and there are up to 32 RAM banks on the board, another digit is needed to complete the designation of the desired bank. The two data digits are both used up, but the address digits after the first two are still unused. So, the Tall Tree Systems board arbitrarily defines the third address digit as part of the bank specification. The board reads this digit and uses its value to complete the specification of the desired RAM bank. This value is what is stored in the memory location specified by the second data digit.

Confusing? Yes, at first, but interesting, too. In the course of solving a tech-

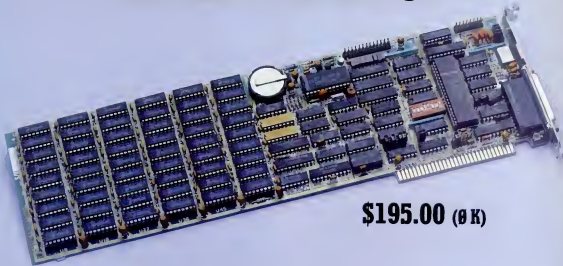
nical problem, the Tall Tree Systems design accidentally illustrates the essentially arbitrary or conventional distinction between data and addresses. Both are represented simply by ones and zeros on various lines connected to each board. Both can be calculated and manipulated by a program in exactly the same way. In fact, the Tall Tree Systems board uses data lines to specify a memory location and makes address lines carry data to be stored there.

How End Users Do It

Naturally, to use either of these boards, a program has to keep track of what information is stored in what RAM banks and be able to calculate the appropriate command to make the desired bank appear in the appropriate address page when needed. It sounds complicated, but, in fact, the task is similar to keeping track of what is stored where on a floppy disk or hard disk. If you are willing to waste some memory, it can be simpler yet: A program can store a single unit or standardized block of information per switchable bank and keep a simple table showing the bank identification number for each unit of information.

Both boards come with programs that take care of the bank switching, so the boards can be used without any additional programming. The Datatron board comes with disk caching software, the Tall Tree Systems board comes with a fancy RAM-disk package, and both come with print spoolers. End users can speed up their existing applications by running them with these packages. The curious can try, gingerly at first, switching banks in and out of the address space manually using DEBUG or small assembly language or BASIC programs to send their commands to the boards. And finally, software developers and more adventurous users can, with the manuals securely by their sides, use the supplied software as models for writing their own specialized, superfast entries in the new field of massive-memory micro-computing. ■

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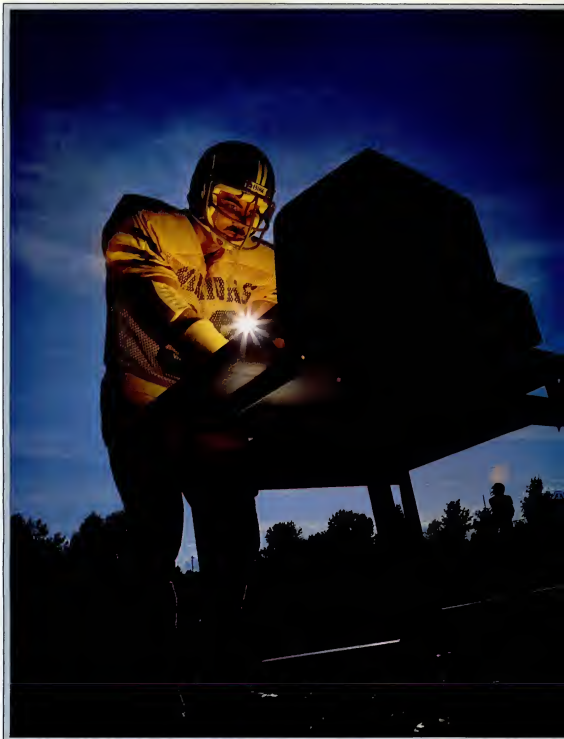
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A VICTORY FOR COMPUTER LITERACY AT WATERLOO

The University of Waterloo in Ontario, Canada, has been in the forefront of computer research and education for decades. Nearly all its students use PCs, even English majors.

Back in the late 1960s, when computers were hulking boxes with flashing lights and spinning tapes kept in refrigerated rooms with elaborate security systems, Canada's University of Waterloo took the radical step of letting mere high school students play with them.

I was one of them. I wrote my first simple FORTRAN program for an IBM 1620 computer at Waterloo when I was a teenager in 1967.

In 1984, when computers are commonplace but computer literacy is not, the Uni-

versity of Waterloo is still in the computer vanguard with more microcomputers per square classroom than most other universities in North America, and a policy that produces graduates—including those in medieval history and English literature—who are nearly all computer literate. At the same time, UW advances the science of computers and is on a par in this field with such American giants as the Massachusetts Institute of Technology and Stanford.

Waterloo is a pleasant city of about 60,000 people about an hour outside Can-



A graduate student at Waterloo during the early days of WATFOR, Paul Dirksen is currently the university's director of computer services.

ada's largest metropolitan area, Toronto. Waterloo's two universities (the other is Wilfrid Laurier University) have a combined enrollment of about 22,000 full-time students, so Waterloo is about as close to a college town as Canada gets.

The university has grown to be among the ten largest in Canada in under 30 years. It has meant good business for Waterloo; a considerable fraction of the town's most exciting industries are spin-offs from the university.

The University of Waterloo itself might be considered a spinoff from industry. It was founded in the late 1950s by three Waterloo-area businesspeople in response to the demand they saw for engineers and other technologically educated people. In its first incarnation, it was an engineering school affiliated with a long-established university 60 miles away; now, it is the largest engineering school in Canada.

Right from the start, Waterloo established two principles that have guided it along a different path from its sister universities: a focus on mathematics and computers, and a healthy respect for practical experience as a part of education.

Waterloo has always paid special attention to mathematics: the most imposing building on the university's campus is the mathematics building. At its heart is the computer room.

Computer U.

Computers were born at about the same time as UW and have matured in tandem with it. Although its engineering department is strong, among Canadian students Waterloo is known as Computer U. One reason is that most students (Canadian and American) who have learned computing in any university have become intimately familiar with UW's most famous products, WATFOR, and its descendant, WATFIV.

WATFOR is Waterloo FORTRAN, the University of Waterloo's FORTRAN compiler, initially developed in the early 1960s to run on IBM mainframe computers. It's a teaching compiler, designed to

An Operating System for the Eighties

Waterloo Microsystems's Port operating system has everything but the kitchen sink: multitasking, multi-users, mice, icons, networking, and windows.

Waterloo Microsystems, Inc., is the commercial offspring of the University of Waterloo's computer research activities, and is 10 percent owned by the university.

Its most significant product is an operating system called Waterloo Port, developed under the direction of WMI vice-president Michael Malcolm of the University of Waterloo's Software Portability Group.

Port claims to be the first operating system to integrate multitasking, an advanced user interface, sophisticated networking, and real-time performance. "First" is impossible to verify, but the operating system's other claims are true.

Port is written in a new language, also called Port, which is similar to C. The language compiles efficiently into machine code. Both the language and the operating system are designed to be easily transported to other computers. Waterloo Port already runs on the IBM PC as well as a number of other microcomputers.

On a single-user standalone machine, Port offers multitasking, windowing, and a user interface that uses a mouse and icons. Port's icons depart from the "desktop" metaphor made popular by Apple's Macintosh and others and uses instead the notion of "rooms." A room consists of a screenful of icons, some of which represent activities that are possible in that room, and others (doors, of course) represent other rooms.

Multiple windows opening onto multiple rooms can share the screen, and activities can continue in rooms that are

not currently being used. Waterloo Port thus meets the test of a true multitasking operating system.

Networks

One of Port's main strengths is that it permits many microcomputers (even different ones) to share a network. Port allows each micro to join or stand off from the network, to attach to or detach from the network any of its own resources (disks, printers, modems), and to make use of the resources any other computer has contributed to the network. Port uses the Arcnet network and claims that access to remote resources over the network is as fast as access to local resources.

Port manages the security and integrity of shared files with "lock files" that contain authorizations for other files.

A set of Port workstations can include server workstations with hard disks and large memories and diskless workstations that boot from the network.

But will it run *WordStar* or *1-2-3*?

Yes—and both at once, if you want. Port runs PC-DOS in a window as a concurrent activity—which means that it will also run DOS in two windows, as two concurrent activities. Because *1-2-3* (like many other programs) writes information directly to the PC's screen, it will take over the whole screen in Port, obliterating all other icons, windows, and rooms. But the computer can, nonetheless, do other things in the background that aren't visible on the screen. Better-behaved PC-DOS programs can be convinced to run under the discipline of Port's windows. —J.H.

efficiently compile small programs. It introduced user-friendly error messages before anyone conceived of computers as having friends. WATFOR was so good that, during an era in which FORTRAN was the pabulum of any computer programmer, it penetrated universities and colleges everywhere.

Paul Dirksen, a graduate student at Waterloo during the early days of WATFOR, is now director of computer services. Dirksen points with pride to the easy availability of the computer power his department delivers. Unlike many universities, where computing is still centered on mainframe machines shared among multiple users, Waterloo makes extensive use of microcomputers. Dirksen estimates that about 400 to 500 microcomputers are available for general student use. The impressive glassed-in room that used to house an IBM 360-75 mainframe is now much emptier—but rooms nearby are wall-to-wall with IBM PCs and other micros.

To link these machines together into effective teaching tools, Waterloo has developed networking technology and software, which, like WATFOR, is likely to find its way into other institutions around North America. If you ever run into a network called "Janet," it came from UW.

Hands-on Education

With all this equipment available, Waterloo emphasizes hands-on education. UW computer science students write their first programs before the end of their first day in the course. Many will also be producing real programs and systems for businesses before they graduate by participating in Waterloo's cooperative program.

At Waterloo, the calendar year is broken into three trimesters—one in the fall, one through the winter, and one during the summer. Waterloo students registered in co-op programs study for one trimester, then work for the next. A bachelor's degree, which in Canada usually takes 4

academic years (a total of 8 in-class trimesters) takes 5 under the co-op program (8 trimesters in class and 6 at work).

The co-op program fits in particularly well with the mix of secondary industries that surrounds Waterloo. Employers, not only in the engineering and computing fields, look to UW co-op students as a pool of potential recruits. They are screened during their work terms and seasoned with more experience than are most recent university graduates. Students who participate are more employable on graduation and less indebted, since the work trimesters help them cover a substantial portion of their university expenses. (Tuition fees are comparable to those at state universities in the United States, on the order of \$500 per trimester.)

The co-op program started in engineering and moved into computer science, mathematics, and the other sciences. Computer science co-op students have always been popular with employers, says Randy Klawitter of the University's Coordination and Placement department. Now, not surprisingly, more and more employers are looking for the kind of extensive microcomputer experience most Waterloo students have.

The co-op program has been so popular at Waterloo that it extends even to the arts. Students in English, sociology, and political science do cooperative programs at such places as politicians' offices and television stations. But Waterloo is so computer-oriented that 90 percent of its students, in all disciplines, have taken at least one computer course by graduation. For co-op English students, this experience leads to such jobs as writing computer manuals and documentation.

Industrial Partnerships

Waterloo's vigorous relationship with business extends beyond the co-op program into a number of schemes and partnerships designed to benefit both business and the university.

Because of its concentration in computers, many of these industrial partnerships

involve computer firms. The arrangements are covered by an umbrella organization called the Institute for Computer Research. For a financial contribution ranging from \$250,000 for "corporate partners" to as little as \$2,000 per year for "affiliates," companies become members

of the institute, which means they can observe the university's research in progress. Such companies as IBM and Digital also supply free or low-cost computers to Waterloo. Two companies affiliated with the institute are even more intimately connected to the university: The

Watcom Markets University Expertise

Watcom Products, Inc., another offshoot of the University of Waterloo's Computer Systems Group, markets the university's network, language interpreters, and compilers.

Watcom Products, Inc., markets computer products developed by its two owners, the University of Waterloo and The Watcom Group. They include a network, language interpreters, language compilers, and a number of others.

Janet, the network, supports multiple PCs (including diskless workstations, which are particularly popular in educational institutions because they are less attractive to acquisitive students). A Janet network can boot individual PCs and can be used to link them to mainframes.

For IBM PC owners, the Watcom interpreters are likely to be of the greatest interest. Watcom PC interpreters are available for APL, BASIC, Cobol, FORTRAN, and Pascal. The interpreters for the latter three accept the full, standard languages. In keeping with their development as teaching tools, the interpreters run on mainframe, mini-, and microcomputers in addition to the PC—specifically, IBM 360/370 computers using the VM/SP operating system, Digital VAX minicomputers using VMS, and the Commodore Superpet micro.

IBM BASICA programmers understand the advantages for developing programs of an interpreted language with a

full-screen editor, advantages that the Watcom products bring to other languages. Waterloo established its tradition of useful diagnostic messages and debugging tools early, with WATFOR and WATFIV (both also sold through Watcom), and the same approaches have been taken with all the other Watcom language interpreters.

An important related product, also available for PC, VAX, and 360/370 computers, is Waterloo Systems Language (WSL), the language in which the other language interpreters are written. WSL facilitates development of software that is portable from computer to computer.

File Manager

Among Watcom's other products is an interesting, quick-and-dirty file management and manipulation program called *Wafile*. No *dBASE II* this, but a program that allows straightforward manipulation of small files. It is not difficult for anyone to learn, but its real attraction is likely to be for computerfolk who prefer a flexible, fast, command-driven data manager to the endless menus, pretty screens, and snail's-pace response that are common in low-end commercial data management products. —J.H.

Watcom Group and Waterloo Microsystems, Inc. Both companies are partnerships that include the university itself.

The Watcom Group grew out of the UW's Computer Systems Group, which developed software and other products primarily for the university's own use—including WATFOR. As the university's output of marketable products increased, it became apparent that the university itself was not the most flexible or appropriate vehicle for marketing them. A group of individuals in the CSG started Watcom as a semiautonomous company outside the university.

The university jointly owns one subsidiary of the Watcom Group known as Watcom Products, Inc., which markets 29 software packages, about half of which are university-developed. These Watcom products run on IBM and Digital mainframes and minicomputers and on IBM and Commodore microcomputers. They include such instruction aids as *Markexam* (for multiple choice tests), language compilers such as WATFOR, WATFIV, and their Cobol equivalent, WATBOL, the Janet networking system, and a series of language interpreters (see sidebar, "Watcom Markets University Expertise"). These products are marketed primarily to schools and universities. About 80 percent of Watcom's total sales are in the United States.

Waterloo Microsystems, Inc., is another partnership spun off from the university, and of which UW retains a 10 percent ownership. Waterloo Microsystems's primary product is an operating system called Waterloo Port that operates on standalone and networked PCs and other microcomputers. (See sidebar, "An Operating System for the Eighties".)

The University of Waterloo is an interesting place. It's new, it's fresh, it's brash—but though it's a new, fresh, brash university, it also has roots. Unlike many institutions of higher education that mushroomed in both Canada and the United States in the 1960s, Waterloo knows where it's been and where it's going. ■

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The Tandy 200 Lap Computer: A Lightweight Heavyweight

Tandy has made careful improvements on its feather-light Model 100. The 200 has extra memory and features without added weight and complications.

A popular image these days is the travelling executive, collar loosened and drink handy, busily typing important documents into a small lap computer while en route from New York to Los Angeles. One of the first computers to make this scenario possible was Tandy's Radio Shack Model 100 microcomputer, a somewhat limited but very portable machine that has become a familiar sight to journalists, salespeople, and airline personnel. The Model 100, weighing in at 3.9 pounds, comes with a built-in modem, BASIC, several relatively simple programs in ROM—a word processor, an address/phone directory, an appointment dialer, a communications/auto-dialer—and up to 24K of RAM.

Since the introduction of the Model 100 in March 1983, several other companies have come out with their own versions of the lap computer. These newer micros tend to be much more sophisticated than their predecessors, including larger, graphics-capable screens, improved memory, portable printers, and even their own disk drives. Unfortunately, while these mini-micros are indeed more versatile, they are also usually a good deal heavier (weighing an average of 10 to 20 pounds), larger, and more difficult to use and store in confined spaces.

As a result, when Tandy announced it was about to introduce an upgraded version of the Model 100, that machine's devotees started to worry. If Tandy had decid-

ed to join the general move toward bigger and better lap computers, there was a good chance that the company could go overboard and ruin a good thing.

Luckily, though, Tandy has shown admirable restraint, and on first examination, the Tandy 200 is a careful improvement upon the Model 100. Major changes include a larger (16-line by 40-character) flip-up LCD screen and the *Multiplan* spreadsheet package in ROM; resident 24K RAM memory, expandable to 72K with the addition of 24K modules that plug into the underside of the machine (there is also a socket for a plug-in 32K ROM chip); built-in calculator and alarm programs; tone dialing; and an improved communications program. Features carried over from the Model 100 include BASIC, a built-in 300-baud modem, both parallel and RS-232C interfaces, cassette tape and bar-code reader interfaces, a simple word processor, a calendar/scheduler, and an address/phone directory. There is now a system bus on the back, and the modem's answer/originate switch on the side has been eliminated.

Screen Gems

Whether you think the new machine is a real improvement on the old one depends on what you feel you need in a lap computer. For example, the new, larger screen is embedded in a flip-up cover of the style that has become very popular in lap-top machines. It now displays 16 lines by 40 characters, doubling the number of lines visible at one time. The characters remain large and easy to read, with the machine

either on a desktop or on the lap.

Although the new screen enables you to see more of your work at once and adds only a few ounces, it does have a few disadvantages. According to Tandy, the cover should "click" into place in at least two different positions, but I found that it only seemed secure fully opened, at about a 100-degree angle to the keyboard. The screen could also prove awkward in more confined situations, such as airline seats (where most lap computers are usually pic-

**Whether you think
the new machine is
a real improvement
on the old one
depends on what
you feel you need in
a lap computer.**

tured). However, I had no trouble whatever balancing the machine comfortably on my lap.

The 200's power button, located on the upper left-hand side of the keyboard, does not automatically shut off the machine or turn it on; I noticed that when I closed the cover and then reopened it immediately, the display was still at the same screen I had left it. In addition, when you first open the computer, you must press the button to boot it. However, if you tend to be forgetful about turning your machine off, you can program it to automatically shut off after a period of time.

The screen display is similar to the Model 100's. The top line shows the current date, day, time, memory bank number, and a Microsoft copyright notice. (Microsoft created most of the computer's ROM software.) The menu then lists all the programs and files currently saved, and a function-key help menu under the bottom lists three functions: bank, copy, and kill. Finally, the number of bytes used by any file is displayed just above the list-

ing when the cursor is on that file. This bottom display means that, although you can still type in the name of the file you want rather than move the cursor to it, there is no longer room for you to see what you're typing on the bottom of the screen. However, knowing how large a file is (and, by inference, how much memory you still have available) compensates for this disadvantage.

The bank function is very interesting. Each bank comprises a separate collection of RAM memory—either the original 24K or one of the add-on modules. Since adding memory creates another storage space for RAM files, you may have files stored in the machine's original RAM memory that do not exist in an add-on module. By hitting the "bank" function key, you can switch between memories; the copy function copies files from one bank to another, and the kill function eliminates any RAM file in any bank.

Many Model 100 users especially enjoy its comfortable-to-use typewriter-like keyboard. Tandy, cleverly, hardly tampered with its keyboard format. The break/pause, paste, label, and print buttons and the function keys on top of the keyboard have been moved slightly to the left. This shift makes room for the readjusted cursor keys, which are in a more logical diamond configuration rather than simply in a line. I did find that the new keyboard had a slightly different feel than that of the Model 100—softer and looser, with a slightly hollow sound. I prefer the older keyboard but didn't find the new one a major setback.

Soft Sell

Tandy has made some additions and improvements to the software as well. The key change is, of course, the addition of a basic spreadsheet package, Microsoft's *Multiplan*. According to a Tandy representative, the company determined more than a year ago that consumers wanted a built-in spreadsheet package. It eventually decided to include *Multiplan* on a separate ROM chip rather than taking up space on



Tandy 200

Tandy Corporation
1700 One Tandy Center
Fort Worth, TX 76102
(817) 390-3011

List Price: \$999 with 24K RAM;
\$249.95 per 24K RAM upgrade
module.

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the computer's standard chip.

Tandy also added a four-function calculator line on the top right-hand side of the screen that can be invoked by hitting the NUM (number lock) and GRPH keys. An interesting alarm function kicks off a one-line message that flashes across the bottom of the screen. You activate the alarm by keying in the date, time, A (for alarm), and your message into the NOTE.DO file (you have to create this file to use the scheduler). The alarm goes off whether the machine is on or off; you kill it by pressing any key. I found, though, that once I had activated the alarm function, my message would appear every time I returned to the main menu, which was annoying. Apparently, this repetition is to prevent you from ignoring the message if you happen to be away from your computer when it goes off—the machine shuts down again after 2 minutes, but the message will flash when the power is turned on. The only way to turn the alarm off is to either remove the A from the message or to remove the message itself.

Lap computers are used predominantly as portable word processors, and the Model 100 contains a simple word processor with simple cut-and-paste block functions

The 200 is an upgrade of the popular model 100 lap computer, not a replacement.

and a find function (but not a find/replace). The Tandy 200's text program is almost identical, with the addition of a list function that lets you find and work on segments of a larger manuscript.

A major advantage of the 200 is the word processor's new print format function, which appears in a small, on-screen box after you press the SHIFT-PRINT key combination. You can format according to width, left margin, page size, lines per page, and location of the top margin (a distinct improvement over the Model 100, which lets you choose only between continuous-feed and sheet-feed printing).

The built-in modem, which is another of the Model 100's useful features, has not been drastically altered. In order to make a call, you use a Tandy modem cable (not included with the computer) to connect the

modem to your phone and either type in the number directly or call it up from your address file. You must then wait until the number is dialed (you can see it reappear on the screen) and then pick up the phone to listen for the connection. Once the connection is made, you hit a function key to convert the screen to terminal status.

The Telcom (telecommunications) program has also been tightened up. The status line that determines the existing protocol now includes the letters O for originate or A for answer (the Model 100 used a switch at the side of the computer.) A new control-character filter switch sifts out ASCII control codes below ASCII 32; Tandy has also added a line-feed switch. Finally, the Tandy 200 allows you to choose tone or pulse dialing. I found the system fairly simple to master, although a help file translating the protocol status line would be handy. (Of course, you can create one yourself without using up too much memory.)

According to Tandy, all Model 100 peripherals will work with the Tandy 200. In addition, those impatient with the idea of continually replacing AA batteries can upgrade their machines to accept rechargeable nickel-cadmium batteries for an extra (as yet unspecified) fee. Once you change over, however, the machine will no longer accept regular batteries.

The 200 is, according to Tandy, an upgrade of its popular Model 100 lap computer, not a replacement for it. The 200 itself is also upgradeable; the extra space provided in the bottom for a ROM chip makes it possible for you to buy additional specialized programs in the future, and its respectable 72K RAM makes it much more useful.

Of course, many commuters probably feel they don't need either the spreadsheet capability or the larger screen and may be happier to pay \$499 for an 8K Model 100 rather than shell out \$999 for the newer machine. However, considering the extra memory and upgraded features, those considering a lap computer will find the Tandy 200 well worth their while. ■

TELEPHONE TAG IS NO KID'S GAME.



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Is It Cheaper in Hong Kong?

Hong Kong is the best place in the world to buy many inexpensive products, especially electronic equipment. So with airfares between Hong Kong and the West Coast under \$700 round trip, does it make sense to buy your computer in Hong Kong?

When my wife and I took our vacation in China during September, using Hong Kong as port of entry and exit, we decided to do some computer shopping. I was looking for an IBM PC clone for myself and a hard disk system of 20 to 30 megabytes for my company.

I had last been in Hong Kong in 1976 and found the city to be much as I had remembered it. Kowloon's Nathan Road is still bustling with shops selling clothing, watches, jewelry, cameras, and audio equipment, but many of the consumer electronics shops are now handling small computers, usually Apple and Atari products. New construction has mushroomed; modern high-rise towers are taking their place alongside the older buildings of this



On a recent trip to China, the author bought a PC clone, one of the few bargains without a pirated BIOS chip.

vertical city. Hong Kong has also built one of the world's most modern and efficient subway systems.

I started my computer shopping by taking the underground to Sham Shui Po and exploring the Golden Shopping Arcade. It follows the traditional shopping arrangement for Hong Kong: a large building packing in dozens of tiny shops facing interior walkways on two levels. In the Golden Arcade, almost all the shops are devoted to computers, computer electronics, or software. It is exciting, but closer

examination shows that most of the machines are 8-bit systems. The Apple II is the most popular machine in Hong Kong, and most of the shops are oriented toward it and its imitations. Apple has been widely copied in Asia, and some of the copies are patent infringements subject to seizure by U.S. customs officials. Taiwan does not abide by international copyright or patent laws and freely reproduces American books, recordings, and software. None of these illegally reproduced

works can be imported into the United States. Hong Kong does observe copyright laws, so that importing Taiwanese book reprints or selling pirated software there is illegal. Even so, both are readily available in the Golden Arcade.

Computer Piracy

Many popular programs for the IBM PC can be purchased in Hong Kong for about \$10 per disk. They include compilers, word processors, database systems, and utilities but not the less common items or more expensive commercial systems. There are several reasons not to give in to the temptation to buy these pirated disks. First, they represent a theft of intellectual property. Second, pirated software seldom comes with any documentation, or if it does, it may apply to a different version or computer system; you would be on your own in trying to figure out how to use it. Unless you have an opportunity to thoroughly test the software where you buy it, you have no assurance that what you have purchased is what it claims to be or that it can be read and executed on your machine. A pirated disk is probably not the latest version of the software, may lack some new features, and is not eligible for updates.

The hardware in the Golden Arcade is mostly made in Hong Kong, some of it the product of small factories located in the upper stories of the shopping center building. Diamond Computer was the only shop I found selling an MS-DOS machine. The \$2,200 price was not competitive with prices in the United States, but the salesman offered to throw in ten pieces of stolen software to sweeten the deal.

After lunch, I went looking for computer stores in Kowloon, guided by some advertisements in the tourist shopping literature I picked up at the airport. I eventually wound up at the Peninsula Centre, part of a complex of ultramodern, steel-and-glass towers in Tsim Sha Tsui East. The upper stories are a hotel, and the lower two form a shopping arcade that includes a number of computer stores. These shops

are more upscale than those in Sham Sui Po, and most feature some MS-DOS machines. Since IBM uses an open architecture for the PC, it has less patent protection than Apple does. The only part of the IBM PC that cannot be freely imitated is the ROM BIOS chip. A computer using a duplicate of IBM's BIOS is subject to confiscation by customs. Many shopkeepers were forthright in stating whether or not their machines were legal. To verify a

In general, Asian
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machine's legitimacy, I brought with me a copy of IBM's diagnostic routines. Any machine that passes all diagnostics infringes the copyright.

At Data Magic, I inspected a machine priced at \$1,100 that had a stolen BIOS chip, 128K RAM, two disk drives, two serial ports, and a parallel port. The salesman suggested taking the machine to the United States without the motherboard, which the store would later mail to me via Canada. I didn't like the sound of that suggestion and looked elsewhere. Microgram had a different MS-DOS machine that also had a copied ROM and went for \$1,540. Pineapple Computer had a clean IBM clone, but it cost a bit much, and I recalled hearing that the manufacturer had been sued by Apple for patent infringement.

Found at Last

At Bena Computer I found a machine to my liking. It carries no brand name and is made in Taiwan. The cabinet looks similar to that of the PC in color and styling

and features a hinged top that allows access to the electronics without dismantling the case. It has two half-height floppy disk drives, space to install a hard disk, and a power supply rating of 100 watts with cables for four disk drives. The motherboard carries no memory, but it contains an 8088 and a socket for an 8087. An included multifunction board carries 256K of RAM, a serial port, two parallel ports, and a clock/calendar chip. Two other slots are occupied by a color/graphics controller card and a half-length floppy disk controller. Since the motherboard has six full-length and two short expansion slots, there is plenty of room to add extra gizmos. The keyboard is laid out identically to IBM's, but it adds LED indicators on the Caps-Lock and NumLock keys, and its cable attaches to the front of the computer instead of the back. The keyboard comes with its own speaker that beeps every time a key is pressed and beeps while a key is held down. This infuriating feature makes the machine sound like a video game arcade when you write. The system comes with DOS 2.0, BASIC, CP/M-86, and supporting manuals. It costs \$1,282. A Sakata monochrome monitor from Japan cost an additional \$83. If I had wanted more memory, \$100 could have bought me an unpopulated RAM card socketed for 512K.

My shopping for other items was less successful. Hard disks are scarce in Hong Kong. A few places had 10-megabyte disks available, but the prices were the same or higher than those back home. Bigger disks were unavailable. Modems that transmit at 1,200 characters per second were also unavailable. I had planned to buy a Hewlett-Packard Thinkjet or Okidata 92 printer but could find neither in Hong Kong. Shops stock Silver-Reed, Panasonic, and Super 5 printers, but the prices are comparable to those in the United States. Buying a genuine IBM PC in Hong Kong would cost more than at home. In general, Asian bargains are confined to technology that is mature enough to have been locally copied and manufactured.

The next day I returned to Bena and gave the machine a thorough checkout. I ran diagnostics and was pleased to see an error message indicating that the BIOS was not a carbon copy of IBM's. It passed the other tests and ran the demonstration software that I had brought with me. The only shortcoming was that the software to set the clock/calendar chip was missing. I obtained assurances that it would be supplied, gave specifications for printer and serial cables, and left a deposit.

That evening, my wife and I picked up our visas for China and took the train the next day into Canton to spend 3½ weeks traveling about China on our own. IBM PC clones are manufactured in the People's Republic, but they sell for about \$8,000.

On returning to Hong Kong, I picked up the computer, paying the balance in U.S. traveler's checks—the proprietor gave me a better exchange rate than the money changers. Visa, MasterCard, and American Express cards are accepted in some establishments, but for this price, he wanted cash.

Customizing

The next big question was getting my purchase through U.S. customs. I had been told that, on return to Seattle, the computer would be detained so that a customs computer specialist could determine whether or not it was legal for import. If the BIOS chip checked out, I would get it back in a few days. In case of an illegal BIOS, the computer would be confiscated. A computer imported with no BIOS chip would be detained on the assumption that it could run only with an IBM BIOS, and the owner would have to prove otherwise.

After landing at SeaTac airport and claiming our computer boxes, we got into the customs line. The couple in front of us got a thorough inspection, but we were waved through with only a few questions. I did have to pay more duty than I had planned. Although the duty on computers is 4.5 percent, and the first \$400 of goods



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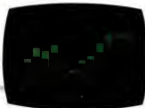
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HONG KONG

per person is free, customs uses a flat rate of 10 percent for everything on the first \$1000 per person above the free allowance. The lower computer rate only takes effect when you have spent more than \$1,400 per person. This system works out fine if you are importing something that costs more than 10 percent duty, but with computers you lose out.

Since I have a degree in electrical engineering, I had not been concerned about converting the power supply from Hong Kong's 200 volts, 50 cycle to the 115 volts, 60 cycle used in the United States, but it turned out to be a bit of a hassle. When I opened the power supplies on the Hong Kong computer and monitor, I found that they had no provision for 115-volt rewiring. Since I had no schematics, I decided that the simplest thing would be to install a step-up transformer to present the computer's supply with a 230 volt input, which it would then convert to DC. By sawing away at part of a heat sink, I made enough room inside the power-supply box to cram in the extra transformer. The computer and monitor had come with the type of plugs that U.S. manufacturers use, and the computer had two convenient outlets in the back. I wired one of these outlets for 230 volts, changed it to a nonstandard socket, and put a matching plug on the monitor that could not fit into a wall outlet. Taking the keyboard apart and cutting the wire to its irritating speaker was easy. The computer has its own speaker, so I still get the appropriate beeps. I checked the printer cable before attempting to use it and found that it was incorrectly wired. Rewiring was no big deal, but I'm glad I didn't try to use it right away.

Thus far, the computer has functioned as expected, with just one minor problem. The clock/calendar employs a lithium battery that recharges while the computer is powered on. Since I spend a good amount of my working hours in front of a computer, my home computer gets only occasional use. When it is left off for a few days, the battery runs down and the time doesn't advance.

(continued)

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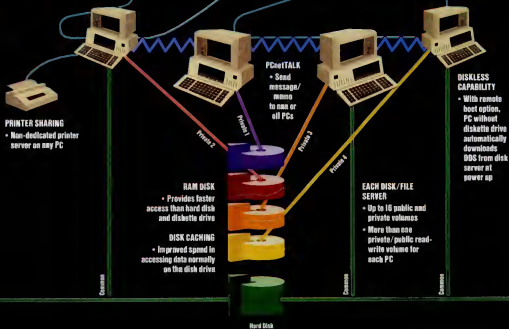
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HONG KONG

What Price PC?

How does the \$1,365 price of my Hong Kong PC compare with U.S. mail-order prices? A comparably equipped IBM (256K, two drives, two serial ports, and one parallel port, monitor interface, monochrome monitor, DOS 2.0) would cost about \$2,500. A TAVA PC with this configuration would run about \$1,700 to \$1,900 since BASIC and DOS cost extra. These prices do not include taxes, shipping, credit card or traveler's check fees.

I have purchased all three of these computers and have been satisfied with each. All three machines are highly software-compatible. While two machines are limited to two floppy disk drives, the TAVA that I received has a Vista floppy disk controller board that can handle four 5¼ inch floppies and two 8-inch drives. The IBM PC is the only one with BASIC in ROM and a plug for a home tape recorder. The Hong Kong wonder has a hefty power supply and more expansion slots.

The price difference is hardly enough to justify a special trip to Hong Kong. I must admit that the thought of spending \$3 per minute to phone my dealer is not reassuring, and previous experience indicates that Taiwanese craftsmanship may leave something to be desired. Since all three of these machines are hardware-interchangeable at the board level, I figure that a failure would probably not cost more than \$200 to \$400 for a replacement board. IBM is the only machine that provides good documentation; the others seem to figure that you can get your information from IBM. I would recommend the TAVA if cost is the primary consideration. If you want a solid product, with great documentation, service facilities, and no question about compatibility, IBM is the way to go. If your travels take you to Hong Kong, and you have the hobbyist's instinct to look after your own hardware, you can save a few dollars by shopping there. ■

Tyler C. Folsom is manager of software engineering for Macrotech Corporation, in Seattle, Washington. He also runs a part-time consulting business.

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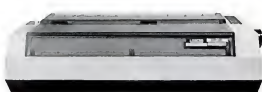
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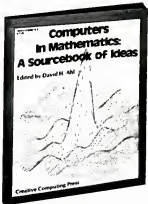
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Recovering Lost Files

Accidental file deletions can be a disaster, unless you have the UNDEL.COM.

If you've handled enough files to follow this column on a regular basis, you've probably experienced many times the sickening feeling of realizing, a tenth of a second too late, that the group of old files you just deleted included the precious final version you had just completed. The Law of Murphy almost ensures that you will plan to rename SPEECH.FIN only after you have cleaned up by getting rid of SPEECH.1 through SPEECH.8. Naturally, what you typed was DEL SPEECH.*.

Your desperate DIR SPEECH.FIN won't bring it back. UNDEL.COM will.

Files in Never-Never Land

Where do files go when you delete them? The simple answer is that they don't go anywhere. The data that constitutes the file is not overwritten with random 0s and 1s, for example. All that happens when you erase a file is that DOS loses the information it needs to locate and recognize the file. Since the file itself is still intact on the disk, however, there's a very good chance that you can restore the information DOS requires. In a word, that's what the UNDEL command does.

To understand how UNDEL.COM operates, the place to begin is with the way DOS stores and reads disk files. The arrangement is a little like the way pop

1985/no.7



beads are attached to form a string. Disks are divided into 1K storage blocks called clusters, each of which corresponds (using double-sided disks) to two sectors. When storing a file, DOS breaks it up into 1K slices, storing each successive slice in the first available (unassigned) cluster it finds. It is these clusters that are linked together to form the file, and it is DOS's job to keep track of the related clusters.

There are more than 300 clusters on a DOS 2.0 or 2.1 diskette, and files are apportioned among them. Your file's clusters may not be contiguous, in fact. If you've stored a number of files on a disk and have deleted some of them, for example, your new file BASEBALL.BAT may

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PROGRAMMING

occupy clusters 100 and 101, but another file may already occupy clusters 102 and 103. In this case, **BASEBALL.BAT** would resume in cluster 104.

How then does DOS keep track of which of these beads belong to which file? A combination of two programming techniques is used. First, each file has its own entry in the disk directory, and in these entries, DOS stores all it knows about a file: its name, its size, its creation date, and—very important—the number of the first cluster it occupies on the disk. The directory entry itself, in other words, always contains the location of the first file cluster on the disk.

Files on the IBM PC can be enormous, of course, filling many, many clusters. Directory entries are short, however, and simply don't have enough room to hold the long list of clusters a file may occupy. Therefore, DOS employs a second programming mechanism. It creates a list on the disk with a place in it for every cluster on the disk. This list is called the File Allocation Table, the appealing acronym for which is **FAT**. The cross-references in the **FAT** are actually the sinews that bind the clusters together.

To Read a File

Assume for a moment that DOS is prepared to read a file, **BASEBALL.BAT**, from the disk. From **BASEBALL.BAT**'s directory entry DOS notes the number of the first cluster on the disk that the file occupies and sends off the disk drive head (via its controller) to read the data contained in those disk sectors. Meanwhile, DOS also looks up this first cluster number in the File Allocation Table to see what to do next.

When DOS checks the first cluster's entry in the **FAT**, it finds either an End of File marker or, cleverly enough, the number of **BASEBALL.BAT**'s next cluster. If there is one, the process is repeated; the head goes off to get the data, and DOS consults the new cluster's listing in the **FAT**. There again, as you will have deduced, is the number of the next cluster

```

10 OPEN "UNDEL.COM" AS #1 LEN = 1 'Open Undel.com
20 PRINT "CREATING UNDEL.COM"
30 FIELD #1,1 AS BYTE.$ 'Specify what goes into it
40 FOR N = 1 TO 532 '532 bytes
50 READ BYTE.$
60 IF BYTE.$ <> -1 THEN 100
70 LSET BYTE.$ = CHR$(0) 'Put in 1536 (storage) zeroes
80 FOR I=1 TO 1536 : PUT #1 : NEXT I
90 GOTO 120
100 LSET BYTE.$ = CHR$(BYTE.$) 'Load byte into buffer
110 PUT #1 'Write buffer out
120 NEXT N
130 CLOSE #1 'Close file
140 PRINT "UNDEL.COM CREATED." 'And you're done.
150 END

160 DATA 233, 112, 6, 48, 67, 41, 32, 49, 57, 56
170 DATA 52, 32, 83, 32, 72, 79, 76, 98, 78, 69
180 DATA 82, 0, 0, 0, 0, 0, 0, 13, 70
190 DATA 185, 188, 181, 32, 118, 111, 116, 32, 182, 111
200 DATA 117, 118, 188, 32, 188, 181, 188, 181, 116, 181
210 DATA 188, 36, 13, 78, 185, 188, 181, 32, 97, 188
220 DATA 114, 181, 97, 188, 121, 32, 119, 114, 185, 116
230 DATA 116, 181, 118, 32, 111, 118, 181, 114, 36, 13
240 DATA 18, 73, 115, 32, 112, 97, 114, 116, 32, 111
250 DATA 182, 32, 121, 111, 117, 114, 32, 182, 185, 188
260 DATA 181, 32, 184, 181, 114, 181, 63, 32, 48, 89
270 DATA 47, 78, 41, 32, 36, -1, 46, 168, 92, 0
280 DATA 44, 115, 4, 188, 95, 98, 33, 162, 27
290 DATA 1, 186, 3, 8, 131, 194, 2, 131, 258, 11
300 DATA 114, 11, 188, 9, 141, 22, 28, 1, 285, 33
310 DATA 233, 169, 0, 129, 38, 21, 1, 0, 0, 232
320 DATA 162, 8, 141, 62, 115, 1, 176, 229, 185, 0
330 DATA 4, 242, 174, 227, 123, 198, 94, 0, 187, 11
340 DATA 0, 75, 166, 116, 252, 131, 253, 8, 117, 237
350 DATA 46, 161, 93, 0, 137, 69, 244, 129, 14, 21
360 DATA 1, 1, 0, 232, 118, 0, 139, 69, 14, 163
370 DATA 23, 1, 139, 69, 16, 169, 255, 3, 116, 3
380 DATA 5, 0, 4, 177, 18, 211, 232, 139, 85, 18
390 DATA 177, 6, 211, 226, 3, 194, 163, 25, 1, 186
400 DATA 1, 0, 129, 38, 21, 1, 0, 0, 232, 73
410 DATA 8, 139, 14, 25, 1, 161, 23, 1, 72, 232
420 DATA 99, 0, 59, 22, 23, 1, 116, 18, 188, 19
430 DATA 186, 92, 0, 285, 32, 188, 9, 141, 22, 52
440 DATA 1, 285, 33, 235, 37, 144, 139, 194, 186, 255
450 DATA 15, 131, 249, 1, 116, 3, 232, 68, 9, 232
460 DATA 288, 8, 228, 238, 186, 1, 0, 129, 14, 21
470 DATA 1, 1, 0, 232, 8, 0, 186, 3, 0, 232
480 DATA 2, 0, 285, 32, 88, 83, 81, 82, 87, 168
490 DATA 27, 1, 185, 2, 0, 141, 38, 115, 1, 247
500 DATA 6, 21, 1, 1, 0, 117, 5, 285, 37, 235
510 DATA 3, 144, 285, 38, 157, 85, 98, 89, 91, 88
520 DATA 195, 88, 83, 81, 64, 139, 216, 289, 227, 3
530 DATA 216, 289, 235, 139, 151, 115, 1, 169, 1, 0
540 DATA 116, 4, 177, 4, 211, 234, 129, 226, 255, 15
550 DATA 131, 258, 0, 117, 225, 139, 288, 59, 6, 23
560 DATA 1, 116, 22, 187, 129, 8, 139, 15, 129, 249
570 DATA 47, 97, 116, 6, 129, 245, 47, 65, 117, 5
580 DATA 232, 6, 8, 227, 195, 81, 88, 195, 82
590 DATA 3, 210, 131, 194, 0, 168, 27, 1, 185, 1
600 DATA 0, 141, 38, 115, 5, 285, 37, 157, 188, 2
610 DATA 178, 13, 285, 33, 178, 18, 285, 33, 187, 0
620 DATA 8, 138, 151, 115, 5, 285, 33, 67, 129, 251
630 DATA 168, 8, 118, 243, 188, 9, 141, 22, 79, 1
640 DATA 285, 33, 188, 1, 285, 33, 185, 1, 0, 68
650 DATA 89, 116, 7, 68, 121, 116, 3, 185, 0, 0
660 DATA 98, 195, 88, 83, 81, 82, 139, 216, 289, 227
670 DATA 3, 216, 289, 235, 169, 1, 0, 116, 4, 177
680 DATA 4, 211, 226, 9, 151, 115, 1, 98, 89, 91
690 DATA 88, 195

```

Figure 1: A BASIC program to create **UNDEL.COM**.

assigned to the file. In this way, the File Allocation Table chains the files together.

Breaking the Chain

When you tell DOS to delete the file **SPEECH.FIN**, it releases **SPEECH.FIN**'s

space in the directory and in the **FAT**, thus completely dissolving the memory of the file. The directory entry is to DOS what a file's name is to us, and the File Allocation Table tells DOS all it knows about its body. When this information is lost,

```

;COMMENT*
; This program will undelete files. To use, type UNDEL filename[,ext] or
; UNDEL filename[,ext], where d is A: or B:. For ASCII files, use UNDEL/A as
; the command instead of simply UNDEL. This will print out what is in each
; cluster before adding it to the file, and will request (Y/N) confirmation.
; Use only for with DOS 2.0 and 2.10 double-sided disks.
;-----*
FCB_LOC EQU 5CH ;Location of FCB for deleted file in the MEF
SWITCH_LOC EQU 01B ;Location of test typed after 'UNDEL'
BIG_A EQU 412FH ;Test chara for /A
SMALL_A EQU 612FH ;Test chara for /s
CR EQU 0D ;ASCII carriage return
LF EQU 0A ;ASCII line feed
CODE_SEG SEGMENT
ASSUME CS:CODE_SEG,DS:CODE_SEG,ES:CODE_SEG
ORG 100H ;To make this a .com file
ENTRY: JMP FIRST

COPY_RIGHT DB 0 ;'(C) 1984 S. HOLKNER'
L_O_FLAG DW 0 ;Selects read or write of cluster
START_CLUSTER DW 0 ;Beginning cluster of deleted file
FILE_SIZE DW 0 ;File size in clusters (1 cluster=2 sectors)
DISK_DRIVE DB 0 ;Drive of deleted file
NOT_FOUND_MSG DB 13,'File not found deleted!' ;Message
WRITTEN_OVER_MSG DB 13,'File already written over!' ;Message
IS_IT_MSG DB 13,'Is part of your file here? (Y/N) $'

DATA DB 1024 DUP(0) ;Space for disk directory and FAT
PROMPT_SECTOR DB 512 DUP(0) ;//A option uses for parts of file

FIRST:
UNDEL PROC NEAR ;Start the process
MOV AL,CS:FCB_LOC ;Get the drive specified - 0 if none given
SUB AL,1 ;Was it a 1 (A:) or 2 (B:)?
JNC DRIVE_KNOWN ;Yes, store drive number
MOV AH,19H ;No, get default drive from INT 21H
INT 21H
DRIVE_KNOWN:
MOV DISK_DRIVE,AL ;Store drive
MOV DX,3 ;Start to search dir. starts at sector 5
ADD DX,2 ;Add two to point at correct dir cluster
CMP DX,11 ;Past end of directory?
JB READ_DIR ;If not, read dir into data area
MOV AH,5 ;Past end of dir & no match, exit with error
LEA DX,NOT_FOUND_MSG
INT 21H
JMP OUT ;Exit
READ_DIR:
AND L_O_FLAG,0 ;Select read
CALL CUSTER_I_O ;Get two sectors into data area
LEA DI,DATA ;Prepare to search for deleted entry
MOV AX,0E5B ;DOS set first char of deleted entry to E5B
MOV CX,400H ;Counter=1024 to search this entire dir cluster
;Look-for-next-deleted-entry loop
SEARCH:
REPNE SCASB ;If no match (Counter=0), get next dir cluster
JCS SI,FCB_LOC+2 ;Possible match, point to 2nd chr of file name
MOV BX,11 ;Compare all chars in name
DEC BX ;Decrement the name comparison loop counter
CMPLoop: DEC [DI],[SI] ;Compare dir entry and deleted file name
JZ CMPLoop ;If match, check next char
CMP BX,0 ;Compare done, all chars matched perfectly?
JNE SEARCH ;No, keep checking through this dir cluster
MOV AX,CS:FCB_LOC+1 ;Yes, get file's first letter
MOV [DI-12],AX ;Move it into deleted entry (replace E5B)

OR L_O_FLAG,1 ;Select a write of 1 cluster
CALL CUSTER_I_O ;Write deleted name to disk
MOV AX,[DI+14] ;Get starting cluster to use in FAT
MOV START_CLUSTER,AX ;Store it
MOV AX,[DI+16] ;Get low word of file size (in bytes)
AND #0FFFFH ;Find # of clusters - is MOD(1024)=0?
JZ EVEN_X ;Yes, don't add 1 cluster before E5B
ADD AX,1024 ;No, need another cluster
MOV CL,18 ;Divide by 1024 (=cluster size)
SRR DX,[DI+10] ;High word of file size
MOV CL,6 ;Multiply by 2^16=65536, divide by 2^18=1024
DX,CL
SRL AX,DX ;Add high word clusters to low word clusters
ADD AX,DX ;And store in FILE_SIZE
MOV FILE_SIZE,AX

```

(Figure 2 continues)

DOS can't find the file again on its own.

DOS is actually quite modest when it deletes a directory entry. It simply finds `SPEECH.FIN`'s entry and replaces the first character with the lowercase Greek letter σ (E5 in hex, decimal 229), leaving everything intact but the name, now `σPEECH.FIN`. This initial character is what marks the file as deleted. Everything else in the directory entry is left unmodified.

DOS is, regrettably, much more thorough in wiping out the file's FAT entries. Using the first cluster number, just as if it were reading the file, DOS skips through the file's chain of clusters and sets them all to zero. The luckless file now resembles so many beads in a box, lacking the unifying thread formerly provided by the FAT's reference links.

UNDEleting a File

Obviously, one thing `UNDEL.COM` is going to have to do is to restore the missing FAT references so DOS can pop the beads back together in their former order. `UNDEL` isn't always successful in this, since occasionally the beads are too thoroughly scattered or mixed with the others. This may occur if you've written and deleted very many times on the same disk.

`UNDEL` will also not be successful if you've written over a file. The clusters for a deleted file are unassigned so far as DOS is concerned and, if a new file needs storage space, these "unassigned" clusters are likely to be the first to be used again. In this way, the hapless file is written over, which is the way you irretrievably lose deleted files.

Using UNDEL.COM

When trying to recover `SPEECH.FIN`, `UNDEL` starts by reading in the entire directory from the disk, quickly scanning for the character σ . Once found, `UNDEL` makes sure that the rest of the file's name matches.

As soon as a match has been found, `UNDEL` begins in earnest. From the direc-

PROGRAMMING

```

MOV     DX,1           ;Read in File Allocation Table (FAT)
AND     I_O_FLAG,0     ;Select a read of 1 cluster
CALL    CLUSTER_I_O
MOV     CX,FILL_SIZE
MOV     AX,START_CLUSTER ;Check if written over already
DEC     AX
MOV     DX,PCB_LOC     ;Move back one cluster from beginning of file
CALL    GET_NEXT_XERO  ;Is next empty space in FAT the START_CLUSTER?
JZ      FILL
JZ      FILL           ;Yes, OK to start filling FAT
MOV     AH,13H         ;No, file written over
MOV     DX,PCB_LOC     ;Delete restored dir entry; point to file name
INT     21H            ;And delete it
MOV     AH,9           ;Exit with error
LEA     DX,WRITTEN_OVER_MSG
JMP     OUT
;So long
FILL:   MOV     AX,DX
MOV     CX,$FFFF       ;Assume this is last entry ($FFFF=End of file)
CMP     CX,1           ;Is it the last entry? (CX=cluster counter)
JZ      LAST           ;Yes, don't need to find next empty entry (zero)
CALL    GET_NEXT_XERO  ;Call with AX=old zero, return DX=new zero
LOOP    FILL           ;Call with AX=old zero, DX=new zero, change FAT
MOV     DX,1           ;Work on next cluster
OR      I_O_FLAG,1     ;Prepare to write new FAT, let copy
CALL    CLUSTER_I_O    ;Select to write 1 cluster
MOV     DX,3           ;Write the cluster
CALL    CLUSTER_I_O    ;Prepare to write new FAT, 2nd copy
OUT:    INT     20H     ;And leave
ENDP

CLUSTER_I_O PROC NEAR ;Recede specified cluster (dir, FAT etc.)
COMMENT* Put start sector in DX, loads cluster into 'DATA' area
PUSH    AX
PUSH    BX
PUSH    CX
PUSH    DX
MOV     DI,AL_DISK_DRIVE ;Get disk drive
MOV     CX,2             ;Request 2 sectors (1 cluster) to be read
LEA     DX,DATA          ;Point to DATA area
TEST    I_O_FLAG,1
JNZ     WRITE
INT     25H              ;Read sector interrupt
JMP     POPFOT
WRITE:  INT     25H
POPFOT: POP     DX
POP     CX               ;Pop the extra push of flags
POP     AX              ;Pop used (destroyed) registers
RET
CLUSTER_I_O ENDP

GET_NEXT_XERO PROC NEAR ;Unrevel FAT and find next empty space in it
COMMENT* FAT entry number (cluster #) in AX, returns next zero in DX
PUSH    AX
PUSH    BX
PUSH    CX
CHECK_NEXT:
INC     AX
MOV     EX,AX
SEL     EX,1             ;(Since each entry is 1.5 bytes)
ADD     EX,AX
SHR     BX,1             ;BX has FAT offset value for entry # in AX
MOV     DX,WORD PTR DATA[BX] ;DX now has FAT entry's value
TEST    AX,1            ;Is the entry # even?
JZ      EVEN_ENTRY
MOV     CL,4             ;Yes, use top 12 bits
MOV     DX,CL
EVEN_ENTRY:
AND     DX,$FFFF        ;Get bottom 12 bits (DX now for even or odd)
CMP     DX,0            ;Is the value for the given cluster # 0?
JNE     CHECK_NEXT
MOV     DX,AX            ;No, look for next cluster
CMP     AX,START_CLUSTER ;If this is the last one, skip /A option
JZ      FFS
MOV     CX,SWITCH_LOC   ;Was /A specified? Check data area in FFS
CMP     CX,100H
JZ      SMALL_A
CMP     CX,SMALL_A

```

(Figure 2 continues)

tory, it finds *SPEECH.FIN*'s size and decides how many clusters it will have to relink.

Also in the directory, of course, is the indispensable first cluster number. Using this, UNDEL knows both where the file begins on the disk and where its first entry in the FAT is.

UNDEL next checks to make sure that no other file was assigned this cluster in the FAT, for if it was, another file has written over *SPEECH.FIN*, and you're out of luck. If this happened, UNDEL lets you know.

If the file hasn't been written over yet, UNDEL skips ahead in the FAT, checking for the next available free cluster. It follows the original DOS assignment rule by assuming that this next unassignable cluster will be part of your file. It then continues to reconnect a cluster chain until it reaches the proper length. If several files are deleted simultaneously, however, this assumption may prove false.

To guard against this, UNDEL.COM provides an additional check to use with text files. If you enter the command by typing UNDEL/A, rebuilding the file is much more precise. In this case, when UNDEL finds a free cluster in the FAT, it will type out a part of it for your confirmation before linking it into the file. If your file is a text file, you can use UNDEL/A and check what UNDEL is doing—which you can't do with the incoherent bytes of a compiled file. Even without the /A option, however, you'll find that most files will go back together flawlessly if you've made no intervening disk writes.

So, if you unintentionally delete a file, don't get panicky. If your copy of UNDEL.COM is on the same disk, and you want to recover your *BASEBALL.BAT* file, just type in UNDEL *BASEBALL.BAT*. If UNDEL is on any other disk, however, don't copy the command onto your sports disk, since DOS may very well, infuriatingly, copy it right on top of the very file you want to restore. Instead, put the disk with UNDEL.COM

PROGRAMMING

into the B: drive and type UNDEL A:BASEBALL.BAT.

Even better, if your file is a text file, watch each part of it as it's being rebuilt. If you enter UNDEL/A BASEBALL.BAT, UNDEL will type out each part of the file as it's reconstructed and ask you piece by piece for confirmation that it belongs. Using UNDEL/A (the A stands for Ask) gives you as good a chance as you'll have of recovering a deleted file.

A Final Checkout

One of the assignments of the DOS program CHKDSK is to inspect the File Allocation Table. You may occasionally have seen such forbidding messages as "Allocation Table Bad" or "File XY.Z Cross Linked." You may even be slightly taken aback when CHKDSK announces that it has found "orphan clusters," which means that chains of clusters were found in the FAT with no directory entry pointing to them.

After you use UNDEL and it's changed the directory and the FAT on the disk, you should use DOS's CHKDSK to check the disk. If there are problems—not that you should expect any—you should delete the file and leave it that way.

UNDEL was written as compactly as I could make it to fit into one article. This means that it has some inevitable limitations. Specifically, it only works for one disk format: double-sided disks under DOS 2.0 or 2.1. Further, it does not recognize pathnames. Perhaps a later version can widen its application.

Despite length-saving limitations, however, UNDEL is a very substantial program—one of the largest you'll see in this column. Typing it in will certainly try your patience, though it's hard to disparage a program that can save you from utter disaster. One way to produce the .COM file is to enter the BASIC listing shown in Figure 1 and then run it. Doing this will convert the data in the data statements, byte by byte, into UNDEL.COM. Alternatively, you can type in the source code listed in Figure 2, assemble it with IBM's

```

      JB      A_OPTION      ;Yes, do /A
      CMP     CX,BIG_A      ;No, maybe a /A?
      JNE     POPE         ;No, leave.
      CALL    PRINT_OUT     ;/A was specified
      JCKE     CHECK_NEXT   ;Print out prompt sector
      POPE:    POP         CX ;If CX set to 0, sector wasn't right
      POP     AX           ;The pops before going
      RET

GET_NEXT_SECT ENOP

PRINT_OUT:   PROC    NEAR ;Print out a prompt sector
      COMMENT* Returns CX=1 if found the right sector, 0 otherwise *
      PUSH    DX           ;Push used reg
      ADD     DX,CX        ;Get 2*BX for sector number
      ADD     DX,8         ;Add 8 to skip boot, FATs and dir
      MOV     AL,DISK_DRIVE ;Get disk drive
      MOV     CX,1         ;Ask for only 1 sector
      LEA     BX,PROMPT_SECTOR ;Load into PROMPT_SECTOR area
      INT     25H          ;Read the sector
      POPF     ;Pop entire flags put on by INT 25H
      MOV     AH,2         ;Prepare to print
      MOV     DL,CX        ;Send a carriage return
      INT     21H          ;Send a line feed
      MOV     DL,LF        ;Send a line feed
      INT     21H          ;Initialize char printout counter
      MOV     BX,0         ;Like it says
PRINT_LOOP:  DL,PROMPT_SECTOR[BX] ;Get char from read-in cluster
      MOV     BX,0         ;Print char
      INT     21H          ;Go on to next char
      INC     CX           ;Done 168 chars yet?
      JCB     BX,168       ;No; go back for more
      JNB     PRINT_LOOP   ;Yes, print prompt message
      LEA     DX,IS_16_MSG ;Get a char from keyboard
      MOV     AH,1         ;Assume found right sector (always optimistic)
      INT     21H          ;Was typed char a 'y'?
      MOV     AL,'y'       ;Yes, found right sector exit with CX still=0
      JZ     FOUND         ;No; was it a 'y'?
      CMP     AL,'y'       ;Yes, leaves with CX still = 0
      JZ     FOUND         ;Not found, exit with CX=1
      MOV     CX,0         ;Pop destroyed CX reg
      JNB     FOUND        ;Pop destroyed CX reg
      RET
      ENDP

PUT_FAT_ENTRY: PROC    NEAR ;Writes new FAT entry into FAT in DATA area
      COMMENT* Pass FAT cluster number in AX and new entry in DX*
      PUSH    AX           ;The requisite Pushes
      PUSH    BX
      PUSH    CX
      PUSH    DX
      MOV     BX,AX        ;Get offset into FAT, 3*AX/2
      SHL     BX,1         ;Multiply by 2
      ADD     BX,AX        ;Add AX to get 3*AX
      SHR     BX,1         ;Divide by 2 -- BX has FAT offset value
      MOV     DX,0         ;Do we have an even entry number?
      TEST    BX,EVEN_ENTRY ;Yes, use bottom 12 bits
      JZ     CL,4          ;No, use top 12 bits
      MOV     CL,4
      SHL     DX,CL
      MOV     WORD PTR DATA[BX],DX ;Put Cluster # into FAT
      POP     DX           ;Do the Pops
      POP     CX
      POP     BX
      POP     AX
      RET
      ENDP

PUT_FAT_ENTRY ENDP

CODE_SEG:   ENDS
            ENTRY ;This sets the starting address to ENTRY

```

(Figure 2 ends)

Macro Assembler (MASM), LINK it (ignore the "No stack segment" error), and run it through EXE2BIN. Since the program is ORG'd at 100H, you can then simply rename the resulting UNDEL.BIN file as UNDEL.COM. Either way you create it, the result will repay the effort the very first time you need it. ■

User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.



Stamp Collecting

I wanted the ability to date- and time-stamp my listings, so I created a batch file I call DT.BAT, which redirects the date and time information into a file or to a printer. To stamp a file, enter DT FILENAME; to have the information appear on a listing, type DT PRN. So that you don't have to press the Enter key when DOS asks for a new date and time, create a file called CR that contains nothing except a carriage return. To do this, type COPY CON:CR and then hit the Enter key twice, then hit F6 (or Ctrl-Z), and then the Enter key one more time.

Then type

```
COPY CON:DT.BAT
DATE < CR > %1
TIME < CR > %1
```

Hit the Enter key after each line, then F6 and the Enter key when you're done. If you want one file with just the date and time, create a DT1.BAT as follows:

```
COPY CON:DT1.BAT
DATE < CR > DATE
TIME < CR > TIME
COPY DATE + TIME %1
```

One last point—the prompts from both DATE and TIME are not redirected to the output file. That's just fine with me since I don't want them appearing on the output file.

Arthur R. Hendrickson, Jr.
Glendale, Wisconsin

The DT.BAT file above will work properly if you're sending the output to a printer, but the time stamp will write over the date stamp if you're sending it to a disk file. However, DT1.BAT will work both if you send it to a printer or a file.

Menu Maker

If you're using DOS 2.0 or above, the AUTOMENU.BAT batch file in Figure 1 and the MENU.BAS program in Figure 2 will automatically generate a menu that lets you access your BASIC programs.

AUTOMENU.BAT redirects your directory to MENU.DIR, first piping it through the DOS SORT filter to put your files in alphabetical order. MENU.BAS



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USER-TO-USER

extracts data from MENU.DIR, sets up the display, and lets you select a program by typing in its number.

Line 170 determines which extensions the program will accept, and currently ignores all extensions other than .BAS and .REM. To list other extensions, add them to this line.

Robert Yankowitz
New Bedford, Massachusetts

We see lots of similar programs, but this one has several elegant features, so long as there aren't an excessive number of BASIC files on a particular disk.

Better FIND

The FINDFILE.BAT (PC, Volume 4 Number 3, page 279) is a useful, simple utility. I found I could make the heart of the program, subroutine -C, more elegant by using DOS's piping rather than redirec-

tion. The fifteenth line of the replacement in Figure 3 replaces the second, third, and fourth lines in subroutine -C of the original FINDFILE.BAT. With piping, DOS automatically takes care of creating and deleting the intermediate files.

Kerry M. Riley
Champaign, Illinois

This is far better than the original, since it not only removes unnecessary steps but doesn't clutter up the screen as much as the older version.

```
echo off
if exist chkdsk.com goto A
echo PUT CHKDSK.COM on your disk
goto END
:A
if exist find.exe goto B
echo PUT FIND.EXE on your disk
goto END
:B
if exist more.com goto C
echo PUT MORE.COM on your disk
goto END
:C
echo NOW SEARCHING DIRECTORIES FOR "X1"
chkdsk /v | find "X1" | more
:END
REN ... done
```

Figure 3: A more elegant version of FINDFILE.BAT using piping.

DIR|SORT>MENU.DIR BASIC MENU.BAS

Figure 1: AUTOMENU.BAT batch file to redirect directory into sorted file.

```
100 * MENU.BAS -- Automatic Menu Generator -- By Robert Yankowitz
110 *
120 CLS:CLS:KEY OFF:DEFINT A-Z:DIN FILE:[00]:PROG=X:COLOR 0,7
130 PRINT TAB(20);"X" * MASTER MENU PROGRAM *";TAB(79);COLOR 7,0:PRINT:PRINT
140 OPEN "I",2,"MENU.DIR"
150 IF EOF(2) THEN CLOSE:GOTO 220
160 INPUT #2,A:IF INSTR(1,A,"-")=0 THEN 150
170 TEMP=X-RID(A,10,3):IF TEMP<>"R&R" AND TEMP<>"REN" THEN 150
180 PROG=PROG+1:GOSUB 370:GOTO 150
190 *
200 * *** PRINT MENU ***
210 *
220 BREAK=INT(PROG/2+1)
230 FOR I=1 TO PROG
240 IF I=BREAK THEN C=50:I=I-BREAK+2:ELSE C=15:I=I+2
250 LOCATE 8,C:COLOR 0,7:PRINT USING "##";I;COLOR 7,R:PRINT CHR(32);FILE(I)
260 NEXT
270 LOCATE R+1,C:COLOR 0,7:PRINT USING "##";PROG+1;COLOR 7,0:PRINT " R&R"
280 LOCATE R+2,C:COLOR 0,7:PRINT USING "##";PROG+2;COLOR 7,0:PRINT " DOS"
290 LOCATE BREAK+5,30:PRINT "SELECT PROGRAM TO RUN:"
300 LINE INPUT PROG:TAL=PROG-TAL:SP=STRING$(LEN(PROG),32)
310 IF PROG=1 OR PROG=PROG+2 THEN LOCATE BREAK+5,30:PRINT RP$:GOTO 290
320 IF PROG=PROG+1 THEN CLS:NEW ELSE IF PROG=PROG+2 THEN CLS:RTSTEN
330 RUN FILE:PROG:END
340 *
350 * *** DECODE DIRECTORY INFORMATION ***
360 *
370 R=LEN(LEFT$(A,8)):RIZ=1
380 FOR I=R TO 1 STEP -1
390 IF MID$(A,I,1)<>CHR$(32) THEN RIZ=I+1
400 NEXT
410 R=LEN(LEFT$(A,8)):RIZ=I+1:FILE=PROG+R&R+"-EXT"
420 RETURN
```

Figure 2: MENU.BAS processes the sorted directory file created by AUTOMENU.BAT in Figure 1 and allows users to run BASIC programs by making menu selections.

USER-TO-USER

DATA Made Easy

The most difficult part of typing in programs with lots of DATA statements (such as the NPAD program in PC, Volume 3 Number 25) is entering the repetitious parts of each line. The NPAD program, for instance, contains 70 DATA lines, each consisting of a line number, the word DATA, and eight numbers separated by commas and tabs.

After typing in about three or four lines, I decided that there must be a better way. First, I set up two function keys:

```
KEY 9. "DATA"
KEY 10. ", "+CHR$(9)
```

I then set the cursor/number pad to numeric with the NumLock key and turned on automatic program numbering with the BASIC command AUTO 320 to continue from where I had left off. Then with my

left hand on function keys 9 and 10 and my right hand on the number pad, all I had to do was hit F9, then F10, then the DATA number, then F10, and so on until I reached the last number in each line, after which I would hit Enter.

This trick let me finish all the typing in record time.

Marin A. Prado
Miami, Florida

A simple but powerful trick. If you do this, write a short BASIC program to redefine your keys (by putting line numbers at the beginning of each line) and save the program. The next time you have to reset your function keys, just run the program. If you do this, add a +CHR\$(9) to the "DATA in the first line to make the output look cleaner.

I always enter such DATA statements in

```
100 ' DATAGEN.BAS
110 INPUT "Start with what number? ",S
120 INPUT "End with what number? ",E
130 INPUT "Call the file what? ",N$
140 OPEN N$ FOR OUTPUT AS #1
150 FOR A=S TO E STEP 10
160 PRINT #1,RIGHT$(STR$(A),LEN(STR$(A))-1);" DATA "
170 NEXT:CLOSE
```

Figure 4: A simple program that generates line numbers and blank DATA statements for entering programs with a word processor.

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USER-TO-USER

WordStar's *N* (nondocument) mode. To make this easy, I first create all the line numbers and the DATA words in each with the program in Figure 4. There's no fancy error trapping, but it works. The nice thing about entering numbers this way is that corrections are much easier than with BASIC's rudimentary editor.

Easy Printer Control

Resetting the control codes on your printer to use its special features can be frustrating. Most people resort to writing short BASIC programs to send the codes to the printer. Why not use special DOS commands to do the same thing?

The DEBUG utility on your DOS disk can be used to create fast and tiny assembly language programs to do the job without loading the BASIC interpreter each time you reset the printer.

```
A>DEBUG PRTBELL.COM
-A
-MOV AH,5
-MOV DL,1B
-INT 21
-MOV DL,07
-INT 21
-INT 20
-
-RCX
-C
-W
-D
```

Figure 5: PRTBELL.COM program to send an ESC BELL command to your printer. Type in everything underlined, and hit the Enter key at the end of each line, including the blank before RCX.

With the procedure below and your printer's owner manual, you can create routine settings for your printer as .COM modules that load and run almost instantly. The program is created by DEBUG, via the following procedure (hit the carriage return at the end of each line):

1. Type DEBUG FILENAME.COM (substituting the name you want in place of FILENAME.COM). This starts the DEBUG utility and tells it to use the filename you want to call your program by. If it is a new file, a "File not found" warning message will be returned.
2. Type A to start DEBUG's line-by-line assembler routine.
3. Type MOV AH,5 to tell the program it will be writing to the printer.
4. Type MOV DL,xx and then INT 21 to transfer a particular character, xx, to the printer. Hexadecimal notation is used for

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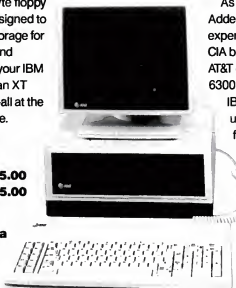
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USER-TO-USER

the character xx. For example, an ESC character would be represented as 1B in the instruction. You should repeat this two-instruction sequence as many times as necessary to send the control sequence you want to the printer. Most printer control sequences are two to six characters long.

5. Type INT 20 to end your program and let it return to DOS. Press the Return key without putting in a new instruction to get back to the DEBUG command analyzer from the line-by-line assembler.

6. Type RCX and the x to load the CX register with the length, x, or your program to be written to disk. The length, x, is the number of bytes, in hexadecimal, of the program you assembled. In this program, each instruction was 2 bytes long, so x would be 8, C, 10, 14, 18, 1C, and so on, depending on the number of times you repeated the two-instruction write to the printer for each character.

7. Type W (then hit Enter) to write your program to the file, and then Q (then hit Enter) to quit DEBUG.

The 12-byte program in Figure 5 sends an ESC BELL (hexadecimal 1B 07) that will cause most printers to sound a bell (or, more likely, a beep). It makes a good test to see if you understood the DEBUG procedure. The program is run by typing in the name of the .COM module you created, PRTBELL, and pressing Return.

John Lawson
Olympia, Washington

This is indeed a handy way to send printer control codes. It takes up far less space on your disk than a BASIC program and BASIC itself and works much more quickly. Remember that the example in Figure 5 sends two characters, an ESC and a CHR\$(7). If you're sending additional codes in the same .COM file and adding MOV DL, x and INT 21 instructions, remember to increase the value you're putting in the CX register. Also note that you can ignore the "File not found" warning in step 1 if you're creating a new file.

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PC Tutor

Printer Checks and Monitor Problems

Q: I have two questions. First, how can it be determined, from within dBASE III, whether or not the printer is online before the SET PRINT ON command is issued?



At present, if you try to print a report or listing and your printer is not online, you are greeted by MS-DOS's annoying "Abort, Retry, or Ignore" error message. Using dBASE III's PEEK () and POKE () commands, there surely must be a way to check the printer status.

Second, I have a PGS HX-12 monitor that seems to take an inordinately long time to warm up. When I first power up, the display is extremely fuzzy, and I have to adjust it with the H-hold control. Over the next 20 minutes I have to gradually readjust the control until it is eventually back to its original starting point. After this initial period, however, the monitor remains rock stable through hours of use. Is this normal?

Mark Oja
Oceanside, California

A: Your PGS monitor sounds as if it has a repair shop problem. The most likely culprit is a slightly leaky electrolytic capacitor. When the set is turned on, the capac-

itor won't charge up to its normal value, though under the influence of the B+ voltage its dielectric gradually "reforms" itself, recovering near-normal capacity. A good capacitor would charge up immediately, and the video monitor would then be stable. There are other possible thermal problems, however, that might cause the same symptoms, so you should have a technician check the monitor out.

As for your dBASE III problem, I can only suggest a rather complex approach. Since the dBASE III manual assiduously avoids mentioning PEEK and POKE, however, I too will avoid them.

First, you need to create a small program (called PRNCHECK.COM) that will check the printer status and return an error level of 1 if an error occurs, 0 if not (see Figure 1). Since this program is very short, you can use DEBUG to create it by typing in the underlined words. Don't enter the explanatory comments, which I have marked off by preceding them with a semi-colon, but press the Enter key where you see <enter>. Don't be concerned if the first four digits of the addresses shown here differ on your computer.

This program calls the printer interrupt, thus requesting printer status. It then checks for an error signal, which occurs either if bits 5 or 3 are high (1) or if bit 4 is low (0). The program sets the ERROR-LEVEL 1 flag if the printer is off-line or not connected.

To implement the PRNCHECK.COM program, you just need to put it in a suitable batch program, which you can create by typing the following underlined words:

```
A>COPY CON: PRNTEST.BAT
PRNCHECK
IF ERRORLEVEL 1 GOTO SRTERR
ECHO STORE "N" TO PNAME >PRNSET.PRG
GOTO END
:SETERR
ECHO STORE "Y" TO PNAME >PRNSET.PRG
END
<Ctrl-Z, enter>
```

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PC TUTOR

The batch program calls **PRNCHECK**. If no printer error was generated, it makes a file named **PRNSET.PRG**, containing the line **STORE 'N' TO PRNANS**. If there was no printer error, the file contains the line **STORE 'Y' TO PRNANS**, instead.

Finally, your sequence of dBASE III commands would be:

RUN PRNTEST DO PRNSET

This will run **PRNTEST** (setting up the file **PRNSET.PRG** to look like a dBASE command), then **DO** the command, so setting up a variable named **PRNANS** with value 'N' if there was no printer error, or 'Y' if a printer error occurred. Your dBASE program can then check the value of **PRNANS** and do whatever you like.

Double Your Pleasure

Q: Does the IBM Game Port Adapter support the use of two joysticks? If a Y-

adapter must be used, is one available on the market or can one be made up easily? What is the proper procedure for addressing each joystick under such a situation?

Ben Baldanza
Princeton, New Jersey

A: The Game Port Adapter is capable of supporting two joysticks simultaneously, though I don't know of a dual joystick adapter. You should be able to make a Y-adapter easily enough, though.

On the back of the Game Port Adapter you will see a 15-pin connector. The pin definitions are:

- | | |
|----------------|----------|
| (1) +5 vdc | (input) |
| (2) Button 4 | (output) |
| (3) Position 0 | (output) |
| (4) Ground | |
| (5) Ground | |
| (6) Position 1 | (output) |
| (7) Button 5 | (output) |
| (8) +5 vdc | (input) |
| (9) +5 vdc | (input) |

A>DEBUG PRNCHECK.COM

file not found

-A100

```

1E9F:0100 MOV DX,0000 ;check printer #
1E9F:0103 MOV AH,02 ;status call AH=2
1E9F:0105 INT 17 ;printer interrupt
1E9F:0107 TEST AH,28 ;error bits on?
1E9F:010A JNZ 0118 ;yes, goto seterror
1E9F:010C MOV AL,18 ;more error bits
1E9F:010E AND AH,AL ;are these both on?
1E9F:0110 CMP AH,AL ;well?
1E9F:0112 JNE 0118 ;no, goto seterror
1E9F:0114 MOV AL,00 ;ok, errorlevel 0
1E9F:0116 JMP 011A ;goto end
1E9F:0118 MOV AL,01 ;seterror: errorlevel 1
1E9F:011A MOV AH,4C ;exit:
1E9F:011C INT 21 ;call DOS
1E9F:011E <enter>

```

-ICK

CX 0000

:28

:W

Writing 28 bytes

-G

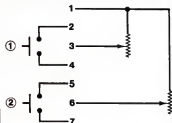
A>

Figure 1: **PRNCHECK.COM** will check your printer status.

PC TUTOR

- | | |
|-----------------|----------|
| (10) Button 6 | (output) |
| (11) Position 2 | (output) |
| (12) Ground | |
| (13) Position 3 | (output) |
| (14) Button 7 | (output) |
| (15) +5 vdc | (input) |

The joystick itself consists of two mechanically linked potentiometers and up to two momentary-contact pushbutton switches that serve as "Fire" buttons. This is shown diagrammatically below.



As indicated, the typical connections between joystick A and the Game Port Adapter tie the fixed end of the x and y potentiometers to pin 1. The x tap (variable resistance) goes to pin 3, and the y tap to pin 6. Button 1 is connected between pins 2 and 4, and button 2 between pins 5 and 7. Make sure you don't accidentally connect a ground to a +5 vdc pin.

To add a second (B) joystick, you would similarly connect the fixed end of the x and y potentiometers to pin 9. Connect the x tap to pin 11 and the y potentiometer tap to pin 13. Button 1 would connect between pins 10 and 12. Button 2 would go between pins 14 and 12. (Pin 12

serves as the ground for both firing buttons on joystick B.)

Checking out your joystick port is easy to do using the short BASIC program shown in Figure 2.

UKase

Q: I have an IBM PC with 64K motherboard, two DDDS disk drives, a Hitachi RGB monitor, and an IBM graphics printer. I am shortly moving to England and want to use my system there. Could I do so just by running it all from a 240V/50Hz to 120V/60 Hz converter? I suspect that because of the PAL standard used in the UK, I might need either a new monitor or a new graphics board or both.

Malcolm Pordes
Framingham, Massachusetts

A: A number of readers in the past have commented that they used their American PCs all over Europe without difficulty.

The PAL standard has only to do with television and so does not affect your RGB monitor. At the same time, however, because the usual step-down transformer affects only the voltage, not the frequency, of the power line, you should definitely check with Hitachi about operating your display using European current.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016.

```

10 REM BASIC joystick checkout
15 STRIG ON : 'Turn button checks on
20 FOR J=1 TO 100 : 'Check stick motion
30 For K=0 TO 3
40 PRINT STICK(K),STRIG(K),STRIG(K+4);
50 NEXT K
60 PRINT
70 NEXT J
    
```

Figure 2: A short BASIC program that checks your joystick port.

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CIRCLE 165 ON READER SERVICE CARD

Spreadsheet Clinic

Tips for spreadsheet users include tricks for using the numeric keypad, suggestions for shielding on-screen data, a 1-2-3 batch file, and a time-saving macro for ranges to be processed.

This is an occasional column on spreadsheet tips and tricks. If you have any tips, shortcuts, observations, bug reports, or other discoveries or questions about spreadsheets, please mail them to PC Magazine's Spreadsheet Clinic.

Keyboard Tip

Sellers of mice for spreadsheet users won't like this suggestion, but anyone who uses 1-2-3 or many other programs will find it a handy little trick.

To enter numerals into the spreadsheet with the standard IBM or KeyTronic keyboard, keep the NumLock key off and push either of the Shift keys with your left hand. When you lift your hand from the Shift key, the arrow keys are once again functional. Conversely, if you enter more numbers than you move around, have the NumLock key on and use the Shift key to enable the arrow and PgUp keys. Try it. For number crunchers, this trick makes the use of spreadsheets fast and easy. I haven't seen this in manuals or books and discovered it simply by accident.

David W. Ederer
Washington, D.C.

This hint is not exactly a secret, but many computer users are absolutely unaware of this convenient way to use the numeric keypad fully. Using a mouse has speed advantages, so suppliers of mouse prod-

ucts need not feel threatened.

The next letter has a more elaborate solution to the numeric keypad dilemma that may appeal to some users:

Numeric Pad Macro

The macro and menu in Figure 1 have

proved to be a good solution to the problem of using the numeric pad for numbers and cursor movement while using 1-2-3. They come from Geoffrey LeBlond and Douglas Cobb's book, *Using 1-2-3*, from Que Corp. in Indianapolis. I have added reminders to toggle the NumLock key

```
A7: \N
A8: /xlTurn on the Num lock key then hit enter"SCRATCH"
A9: /xgNUMCONT"
A12: /NUMCONT
A13: /xnEnter a number in the current cell:"
A14: /xgNUMENTRY"
A17: /NUMENTRY
A18: 8
B18: 6
C18: 2
D18: 4
E18: 5
F18: 3=Double Down
G18: 9=Right Twice
H18: 7=Left twice
A19: /Use cursor keys to move, 5=QUIT, 3=DOWN TWO, 9=RIGHT TWO, 7=LEFT TWO
A20: /up)
B20: /right)
C20: /down)
D20: /left)
E20: /xlTurn off Num lock then hit enter"SCRATCH"
F20: /down)
G20: /right)
H20: /left)
A21: /xgNUMCONT"
B21: /xgNUMCONT"
C21: /xgNUMCONT"
D21: /xgNUMCONT"
E21: /wq
F21: /down)
G21: /right)
H21: /left)
F22: /xgNUMCONT"
G22: /xgNUMCONT"
H22: /xgNUMCONT"
```

Figure 1: A macro to make entry of numeric data easier by alternating the function of cursor keys. The named ranges are: \ N (cell A8), NUMCONT (A13), the menu, NUMENTRY (A18), and SCRATCH (A24, or anywhere out of the way). The worksheet is printed with the Cell-Formulas option for readability.

SPREADSHEET CLINIC

when starting or quitting the macro. I also added functions for quit, down two cells, right two cells, and left two cells. When setting up this macro and menu, you must name four ranges. The first line is named \N and starts the macro by hitting Alt-N. The second line is named Numcont for the looping and continuation of the macro. The third range is the Numentry menu. The fourth range is called Scratch and can be put anywhere out of the way. The Scratch range is used in the reminder messages at the start and end of the macro so your response does not overwrite the last number entered.

Allan Schechet
Los Angeles, California

Users who find this set of macros of value will want to incorporate them into worksheets that require much numeric data entry. After you invoke the program with Alt-N, it alternates between two states. First, it prompts you and waits for you to input a value into the cell where the cursor is. Second, it presents a menu that has all choices beginning with numerals (cells A18 to H18).

Thus, since you can pick any 1-2-3 menu item by typing its first character, you can leave the numeric keypad in NumLock and use it both for data entry and menu selection. Menu choices 2, 4, 6, and 8 correspond to single cursor moves, whereas 3, 7, and 9 let you move two cells at a time. The 5 key has been designated to halt the macro. Some people may find better uses for the odd-numbered keys.

Worksheet Security

Here are two hints for 1-2-3 users. Some hints show that when you save a file in a macro, the file being saved must already reside on the disk. The suggested keystroke sequence has been /FSfile-name~R.

This isn't the only way to address the problem of saving files in macros; a more flexible sequence is /FSfilename~R [sc], which allows you to save files that haven't been previously saved and automatically

to replace files that have been previously saved.

In detail, the macro works as follows: the macro attempts to save the file; if the file is already on the disk, it is replaced. In this case, the escape code does nothing because the command line will be blank. If the file isn't already on the disk, the file is saved, but the macro leaves an unnecessary R on the command line. In this case, the escape code will clear the R so it doesn't interfere with commands that may follow.

Occasionally, I have to use 1-2-3 at work to analyze sensitive business infor-

I have developed a few techniques that allow me to work discretely on sensitive data.

mation. Unfortunately, the PC I must use isn't in a secure area, and other people can interrupt a work session. I have developed a few simple techniques that allow me to work discretely on sensitive data.

The first problem is that of someone's coming up suddenly while confidential data is on screen. Paging or tabbing is an obvious solution unless you are working on a large worksheet. Turning the monitor off is a bit obvious and may not be good for the monitor. The solution is to press F1, the help key. The screen clears instantly, and in a second or two, a help screen appears.

There are a few situations in which this measure won't suffice, for example, recalculating a large worksheet. The current screen values remain visible during recalculation. If recalculation takes awhile, you should page to a blank area of the worksheet before pressing F9, the calc key. Then it doesn't matter how long it takes to recalculate.

While you are retrieving a file, the screen is blank; then 1-2-3 displays the

screen exactly as you left it when you saved the file. If you might be called away while retrieving a large worksheet, you should make it a habit to go to a blank area of the worksheet before saving it. By doing this, the screen will be blank when you retrieve the worksheet.

When you have to leave the PC for even brief periods of time, it's best to save the worksheet and then erase the worksheet area. The techniques discussed earlier just don't work unless you can stay with the PC.

Jim Pottkotter
Memphis, Tennessee

When you save a file to disk, 1-2-3 checks if a file with that name already exists. If not, the save operation is completed and control returned to you. If the file has been previously saved, however, you're prompted to cancel the Save command or replace the old file by overwriting it with the new one. The advantage to adding an escape code after the Save command as shown in Figure 2 is that the person writing a macro isn't burdened with knowing whether or not a file already exists.

In some situations, it may be important to let you verify a save operation and then return control to a macro. In Figure 2, the submenu, MENU.SAVE, appears when you choose Save from the main menu. This process emulates 1-2-3's verification step.

The data security suggestions are useful for PC users in an office. Unlike paper, a computer monitor cannot be casually turned upside-down or shuffled around on a desk. Hitting the End Home PgDn key sequence, or incorporating it into a macro, is probably the fastest way to reach a blank area. With 1-2-3, the End-Home key combination takes you to the lower-right corner of any worksheet.

1-2-3 Batch File

As an avid 1-2-3 user, I like that the worksheet defaults can be tailored to my needs. A problem arises because I use a hard disk with worksheet files located in several

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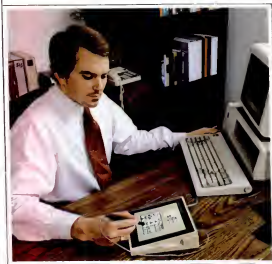
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CIRCLE 308 ON READER SERVICE CARD

	A	B	C
1			
2			
3			
4	MENU.MAIN		
5	Save	Print	Quit
6	Save this file to disk	Print data in REPORT range	Exit to DOS
7	/xmMENU.SAVE	/pprREPORT"aqg	/qy
8		/xmMENU.MAIN	
9			
10			
11	MENU.SAVE		
12	Cancel	Replace	
13	Return to Main Menu	Save even if file already exists	
14	/xmMENU.MAIN	/faTHISFILE"n{cac}	
15		/xmMENU.MAIN	
16			

Figure 2: Two sample 1-2-3 menus, MENU.MAIN (cell A5) and MENU.SAVE (cell A12) show how you can be permitted to cancel a Save operation and have the control return to the macro that initiated it.

subdirectories. It is inconvenient to use a /Worksheet Global Default Directory command each time I use 1-2-3. Using batch files eases this difficulty.

Let's suppose, for example, that 1-2-3 resides in C:\LOTUS, and I have worksheet files in the C:\WP, C:\WP\BUDGET, and C:\PRODUCT\FORECAST subdirectories. Start by copying the file 123.CNF to 123X.CNF. Enter 1-2-3 and issue a /Worksheet Global Default Directory command. Enter a subdirectory in which you have worksheet files, such as C:\WP\Budget. Now do an Update to write the change to the file 123.CNF. Exit 1-2-3, and rename 123.CNF to an appropriate file such as BUDGET.CNF. Now copy 123X.CNF to 123.CNF. Repeat these steps for each subdirectory as necessary.

Rename LOTUS.COM to LOTUSX.COM. Create the batch file LOTUS.BAT as follows:

```
C>COPY CON LOTUS.BAT
ECHO OFF
COPY %1.CNF 123.CNF > NUL
LOTUSX
COPY 123X.CNF 123.CNF > NUL
```

Press Enter after each line and close the batch by pressing F6 and Enter. To use the batch file, enter a command such as

```
C>LOTUS BUDGET
```

and 1-2-3 will be brought up with the correct default directory. If you don't specify a subdirectory on the command line, the

original default directory from 123X.CNF will be used.

Joel M. Borden
Cupertino, California

Here is good example of how to use replaceable parameters in a batch file, as described in the commands section of the DOS manual. You need to rename the LOTUS.COM file as LOTUSX.COM to allow the LOTUS.BAT file to execute (otherwise LOTUS.COM takes precedence, and the .BAT file is ignored).

At the time of execution, whatever text follows the batch filename on the command line replaces the %1 in the second line. Therefore, in the present example, COPY %1.CNF 123.CNF will become COPY BUDGET.CNF 123.CNF after you enter LOTUS BUDGET from DOS.

When you need to convert a large range of formulas to their values, EDITRANGE is one of the most efficient ways.

The ECHO OFF statement in the first line and the > NUL at the ends of lines 2

and 4 are optional and merely suppress output to the screen while the batch file is running. You could delete them to remind yourself that 1-2-3 is being loaded with a modified procedure.

For those who don't use Lotus's access system and prefer to enter 1-2-3 directly from DOS, the techniques still apply.

Use the REN command to change 123.EXE to 123X.EXE. In the batch file, the third line, LOTUSX, will be 123X instead. Remember that 1-2-3 can't be loaded from the Lotus access system after this name change.

The idea can be similarly extended to Symphony users who want different versions of the SYMPHONY.CNF file available. The batch file might be called SYM.BAT. Choose the {services} Configuration key sequence, make the desired changes to the configuration settings sheet, then choose Update to modify the SYMPHONY.CNF file.

Conversion Macro

I frequently have to take the results of one calculation and move them to a different place on the worksheet. I then replace the data and perform the same calculations again. This means that I can't simply move the calculated fields to a different section because their values also will change when the worksheet recalculates. The obvious solution is to use the {edit} {calc} function key sequence for each cell after the cells are moved.

For many cells this process takes a great deal of time, and writing the macro for multicolumn processing is onerous. A simple solution for the long edit-calc process is first to name the entire range to be processed and then execute the macro shown in Figure 3.

This process can be a timesaver for big ranges, especially given the execution time for an {edit} {calc} loop.

Richard Pupko
Orlando, Florida

In many possible situations, you may need to convert a large range of formulas to

```

/rncCURRCELL~{bs}~
{goto}EDITRANGE~
/fxvGLOOPXXX~EDITRANGE~r{esc}
/fcxeGLOOPXXX~
{goto}CURRCELL~

```

Figure 3: A 1-2-3 macro to save a range of formulas (EDITRANGE) to disk as values, then recombine them into the current worksheet. The file GLOOPXXX is a dummy file used as temporary storage for the values.

their values, and EDITRANGE is one of the most efficient ways to do it. This macro takes advantage of 1-2-3's option, when using the /File Xtract command, to save a range to disk as Formulas or Values. The range is extracted in Value form, then immediately brought back into the work-

sheet with the /File Combine Copy Entire File command. Creating the range CURRCELL at the beginning of the macro serves as a place-marker while the work is being done.

An alternative procedure is to use the /Data Query Extract command instead of

/File Xtract, as this process also evaluates formulas as they are extracted to the Out-put range. You have the option of using the same techniques manually rather than within a macro.

The problem has been addressed in Symphony with the {menu} Range Values command, similar to Copy, but evaluating formulas in the process. The From and the To ranges may be identical.

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s-side 27 ⁵⁰	s-side 34 ⁵⁰	s-side 30 ⁹⁵	s-side 30 ⁹⁵
d-side quad 33 ⁹⁵	d-side quad 45 ⁵⁰	d-side quad 28 ⁹⁵	d-side quad 39 ⁹⁵
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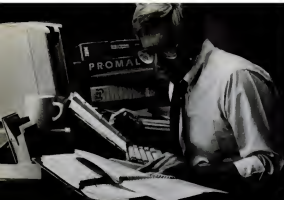
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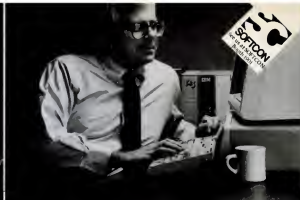
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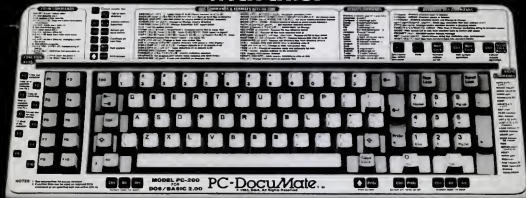


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PCs in Prenatal Care

With the help of new low-cost software for the PC, doctors can quickly analyze the results of ultrasound tests and tell anxious parents-to-be whether their babies are normal.

At about 7 months of pregnancy, the child within a woman's uterus is well on the way to full size. It moves frequently. The parents' desire to take a peek at the person within is frequently irresistible.

Obstetricians are curious themselves and often need to chart the physical development of the fetus both to accurately predict the "estimated time of arrival" and monitor any developmental aberrations.

Medicine's way of satisfying this curiosity is the sonogram, a safe and relatively straightforward procedure that uses ultrasound, or high-frequency sound-



waves, to explore regions within the body. And PCs are the perfect tools for helping physicians interpret sonogram results.

Ultrasound is used extensively in other medical specialties as well, for studying the liver, kidneys, heart, gall bladder, and spleen. A sonogram's biggest advantage—and what makes it particularly well-suited for prenatal examinations—is that it uses no harmful ionizing radiation (X-rays). The system works by bouncing soundwaves off the fetus or organ. They bounce back to a machine that takes its readings from the reflected echoes in order to create the sonogram picture.

Lengthy Calculations

When taking a look at a fetus, it is not so much the sonogram picture that counts, but the fetal measurements that can be taken from it. Unfortunately, in most cases making sense of those measurements means a half-hour's worth of spreadsheetlike calculations that must then be compared against the published norms. For parents who are awaiting news of their child's condition, a half-hour can be excruciatingly long. For an obstetrician with a waiting room full of patients, a half-hour of calculation is a waste of otherwise productive time.

Several ultrasound software packages are available for the PC that automatically take sonogram measurements, make calculations, and print out a range of information—including the fetus's estimated age and the relative development of its vital organs. Some cost as much as \$5,000. Although the computer's sorting and organizational capabilities help facilitate an efficient sonogram examination, a PC is not a mandatory piece of equipment for the procedure. Thus, many practitioners have a difficult time justifying the PC's expense to stringent hospital budget committees.

OURS

However, Dr. Philippe Jeanty, a resident in the Department of Radiology at



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Yale University, in an effort to make such programming affordable, developed his own ultrasound software for the PC, *Obstetrical Ultrasound Reporting Software (OURS)*. It's a template designed to be loaded into Version 1A of Lotus's 1-2-3.

"I found that by using 1-2-3 to take care of all the low-level instructions, it freed me to concentrate on the program's functions," he says. His goal was to create a program that could find and chart

OURS is simply an aid; a specialist still has to make the final diagnosis of any abnormality.

the full range of ultrasound calculations, including measurements of the fetus's head, abdomen, crown-rump length, binocular distance (the distance between the eyes), biparietal diameter (the parietal is a bone located behind the ear), and limb lengths.

"The measurements still have to be input through the computer keyboard. But the computer does a half-hour's worth of calculations in just a few minutes," he says.

Physicians begin by entering the date of the mother's last menstrual period and all pertinent information about the patient and the referring physician. *OURS* then displays a worksheet on which doctors adjust and fill in the different fetal parameters measured by the sonogram. The computer then assesses this information and flags the data as "normal" or "abnormal."

How Old?

OURS then suggests a range of gestational ages—some of which may be far removed from the fetus's alleged age. Physicians can choose from this range what they believe to be the most accurate

figure. The physician's judgment is particularly important when abnormalities are suspected—such as hydrocephaly (too much water in the head), which might result in an erroneous age readout because of the enlarged head measurement.

"In such instances, you wouldn't use the head perimeter to find the gestational age," Jeanty explains. "You can measure the femur, which is the big bone in the thigh, or the humerus, which is the bone in the proximate portion of the arm. If, for example, they both indicate the same age, but the head measurement gives a different result, that's an indication that there might be an abnormality in the skull, and the age should be determined by the bone measurements."

Jeanty emphasizes that *OURS* is simply an aid; a trained specialist still has to make the final diagnosis of any abnormality. Having the computer make this decision by itself would be quite dangerous, Jeanty explains, because the machine is "incapable of detecting subtle abnormalities that can creep in."

It is also possible that a measurement may be inaccurate because of the fetus's positioning inside the womb at the time of the examination or because the picture lacks definition in the areas of the body being measured.

Meanwhile, Jeanty points out that some women do not recall the exact date of their last menstrual period at all and some of those that do remember it are mistaken because of delayed ovulation. "The program is designed to allow for such errors," he notes. "If you have figures that seem inconsistent with the other readings, you can either dismiss them or investigate for an abnormality—if you suspect one."

Jeanty emphasizes that a sonogram picture "is not like looking in a mirror." Errors are only to be expected.

Nevertheless, he believes the software has advantages in detecting and dealing with many prenatal abnormalities. For example, if, according to the PC's calcu-

lations, a baby seems unduly small, it may be a sign of an Rh incompatibility between the fetus and the mother. This incompatibility may dictate delivery of the baby ahead of schedule.

Jeanty himself wrote the *OURS* equations that flag these problems, except for those for predicting fetal weight (by Dr. M.J. Shepard et. al.), predicting intrauterine growth retardation from estimated fetal weight (by Dr. F.A. Chervenak et. al.), and evaluation of the crown-rump length measurements (by Dr. H.P. Robinson et. al.).

Time Saver

In addition to its clinical applications, Jeanty claims that *OURS* increases administrative productivity by making quick printouts of files and improving recordkeeping. He does, however, suggest that you print hard copies of your records, since 1-2-3 isn't designed for instant search and comparison of files.

He says the next step would be to find a way to directly download the measurements from the ultrasound machine to the PC, eliminating the need to rekey the data.

Shortcomings

As head of Yale University's PC Users' Group, Jeanty is acutely aware of the program's shortcomings. One limitation is in the microprocessor itself: it's slow. He also points out that 1-2-3 has limitations, citing its "weak data management system" and its inability to "deal with 'if' conditions based on alphanumeric characters instead of numerals." Still, he expects to see some improvement in these areas when he adapts the program for *Symphony* on the IBM AT.

Jeanty sees many possible uses for the PC in medicine. "In any medical application where numerous measurements are needed, I can see the PC coming into play," he says. "The idea is to encourage specialists to apply the machine to their fields and then hope they widely distribute their programs." ■

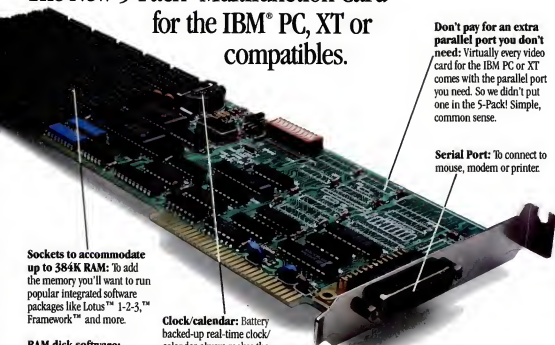
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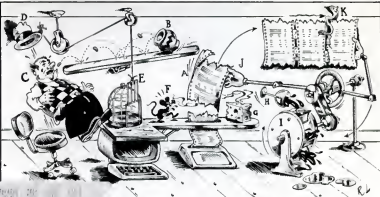
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Support for Science: IBM's Latest

IBM hasn't left its faithful following of PC scientists in the dust. Along with the AT, it introduced a host of new products to accommodate those using the PC family in the scientific world.

Engineers and scientists, beware! You're about to be enmeshed even more deeply than ever in the IBM PC web. The not-so-secret password is E/S³, which stands for Engineering/Scientific Support System.

Buried in the flurry of new product announcements made by IBM last August and September, following the introduction of the PC AT, was a comprehensive line of accessories designed specifically for laboratory and engineering applications. Given the PC's tremendous popularity among the white-coat set, the hardware and software packages should be a powerful boost not only for the AT in laboratories and design offices, but also for the XT and PC.

The Data Shuffle

And there's more. E/S³ is designed to work with the IBM 4300 superminicomputer family, allowing data and graphics to be shuffled back and forth between them. And it interfaces with the IBM 5080 Graphics System, when used with CADAM, CBDS 2, CAEDS, and other IBM or IBM-compatible extended simulation or design systems. (These software systems have been designed for drafting, circuit-board design, and other engineering functions.)

Here's a rundown of IBM's more prominent recent announcements. Most



of these products are scheduled for delivery this year.

A combination of monitor and controller card provides better graphics representation for the PC, XT, and AT. The monitor, called the Professional Graphics Display, is a 13-inch, RGB display with 640-by-480-pixel resolution; it sells for \$1,295. It has a fast 30.48-KHz horizontal scan, and the screen is darkened and has an antireflective coating.

Graphics for Pros

Running this monitor is the Professional Graphics Controller, a three-card set selling for \$2,995 that takes up two slots in the PC. In fact, the monitor can

be used only with this controller. In an emulation mode, the controller can act as a substitute for the current IBM PC Color Graphics Adapter (which serves to reduce the pixel matrix to 640 by 400) and generally can be accessed in the same manner.

A progressive feature of the controller is 64K of on-board memory, which IBM has loaded with graphics firmware. More memory is needed to run a diagnostics program, which can be invoked by the user.

Graphics Primitives

The firmware contains a long list of graphic functions. "Graphics primi-

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SLIMLINE - TEAC 858	\$155.00

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IBM MONO PRINTER ADAPTER	\$230.00
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PERYST MONO PRIN-TR ADAPTER	\$210.00
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ENGINEERING

tives," for example, includes two- and three-dimensional representations and geometric figures such as arcs, circles, and rectangles. Representations can be rotated, scaled, and translated. Projections can be made in perspective, orthogonal and distancing. Colors—there are 256 colors from a palette of 4,096—can be set to fill areas, patterns, masks, and other sections. You can also fill a "look-up table" with values and then access it during a drawing session.

The ability to hook a lab instrument to a PC and collect data automatically should make laboratory workers very happy. Data can usually be "massaged"—filtered, summed, or manipulated in some way—at the same time, and the screen then displays a useful curve on a graph. This is a job that takes hours of calculating and drawing when done manually.

DACA

IBM's Data Acquisition and Control Adapter (DACA), which costs \$1,275, is a card that fills one slot. An optional DACA Distribution Panel, which costs \$245, provides 88 terminal points (with screws for wiring connections from an instrument to the PC) organized according to various I/O strategies. Additionally, software to help run the acquisition process and to interface with programming languages will be available soon. It will sell for \$160.

DACA itself features analog and digital I/O conversions, which can support 20 input channels (4 analog and 16 digital) and 18 output channels (2 analog and 16 digital). A 32-bit programmable timer is included. Up to four DACA PCs can be used with one system.

In addition to running data in and out of the PC, DACA can control processes with its software. It supports BASICA, Compiled BASIC, Lattice C, FORTRAN 2.0, and IBM PC FORTRAN. PC-DOS 2.0 or higher is required (or DOS 3.0 with the AT).

An IBM listing of the types of instru-

ments that can be interfaced through DACA includes chromatographs, spectrophotometers, pressure or level gauges, thermocouples, and various cells, meters, and sensors. Control applications include energy management, robotics, chromatography, electrochemistry, and the usual data logging.

GPIB

The General Purpose Interface Bus (GPIB) Adapter, which sells for \$395, is a half card that provides IEEE-488 communications with thousands of electronic meters, instruments, or operational gear. (IBM specifies the IEEE standard as the 1975/78 version, including the 488A-1980 supplement.) Up to four cards can be installed in a PC, providing support for up to 48 devices. The card is offered with software, which requires DOS 2.0 or higher to run all these connections. The software sells for \$85 and contains a long list of commands with which you can poll a device, change its settings, or start and stop various functions. Data transmission rates are either 300K per second on a direct-memory-access basis, or 20K per second under a programmed I/O rate.

IBM has announced more software products for E/S applications than hardware. A complete description of all the products could easily fill this issue of PC, but instead here's a brief rundown of what's available:

- The Graphics Development Toolkit (\$350) is a grab bag of various necessary functions that are used either at the operating system or "device" (that is, a printer or plotter) level. Functions include graphics primitives for lines, circles, and polygons; instructions for text-mode work to mix graphics and text; and size control of graphical representations for such hardware as printers or plotters.

- GDT requires 128K of RAM, a PC or AT disk drive, and DOS 2.1 or higher, and it comes on three 360K disks.

- The Graphical Kernel System (\$295) works mostly as a set of source-code-inde-

ENGINEERING

pendent subroutines that lets programmers easily include graphics functions in a program. A long list of basic graphics functions, such as setting line, color, initializing, and inquiring, are included. It contains more than 100 subroutines.

GKS requires 256K RAM, two 360K disk drives (or the AT's 1.2-MB drive), DOS 2.1 or higher, and any of several IBM compilers, including BASIC Compiler 1.0 or higher, FORTRAN Compiler Version 2.0, Professional FORTRAN Compiler 1.0, and Lattice C Compiler. IBM recommends that 128K more RAM is used, along with an 8087 or 80287 coprocessor and a hard disk. GKS comes on six 360K diskettes.

• The Graphics Terminal Emulator (\$295) is designed to make the PC or AT function similarly to two of the most popular mainframe-to-terminal graphics stations. Those are the Texttronix 401X or the Lear Siegler ADM-3A. The Graphics Terminal Emulator provides icons for entering or exiting graphics routines and configuring keys to simulate terminals, to ask for help, and to call output devices. Uploading and downloading features allow files to be transferred from a mainframe to the PC and to perform operating system-type functions at the PC.

The hardware requirements for the Graphics Terminal Emulator are basically the same as for the Graphics Toolkit, except that it also needs a serial port and a modem; it comes on three 360K diskettes.

New and Noted

Other noteworthy programs are the IBM Plotting System (\$225), for creating charts, and the Graphical File System (\$175), which stores and retrieves files.

In general, IBM officials say the company is following emerging ISO/ANSI graphics standards. At this point, most of the software seems to be programs that vendors will use to develop specific applications programs for various scientific or design needs. The across-the-board inclusion of most of the IBM PC family,

and not just the AT, suggests that IBM is committed to supporting its large base of installed customers—welcome news for those who might fear being left behind if

they do not upgrade to the AT. ■

Note: Additional information about these products is available at IBM Product Centers.

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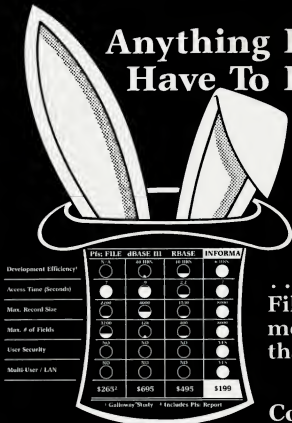
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PCs Forecast Down on the Farm

PC-owning farmers take note: If you hedge your crops or trade farm commodities, Chart Analyst and Crop Model are two packages that can slash the risk of getting burned.

Farmers are far more interested in cutting costs and making profits as farmers than in speculating in commodity markets as traders. Market charting done by farmers generally has a direct link to crop production or to their farm-related financial activity.

For this reason, farmers can applaud the growth of commodities trading linked with computer communications, which has greatly expanded their stock of management and marketing tools. The best evidence of progress in this area is the number and variety of new charting programs available for the farmer who hedges and trades.

Because trading is a challenging art, a program that simplifies the tracking of stocks and commodities is a welcome addition to the farmer's software library.

Chart Analyst is one such program. It



computes daily moving averages; draws trend lines, cycles, channels, spreads, and localized basis; and provides volume and open-interest figures. It also functions as a newswire, using the Professional Farmers of America's Instant Update service to keep you informed during and after trading hours. *Chart Analyst* brings your monitor to life with bar, point, figure, and moving-average charts that display several months of trading activity.

One common trading technique, based on moving averages, is particularly difficult to plot. However, with *Chart Analyst*, you can select up to five different moving averages and choose from 1- to 60-day averages.

Chart Analyst also allows examination of inter- or intracommodity spreads and lets you keep track of local cash bids and plot local basis. You can select a single-line chart showing the difference between cash and futures or a double-line chart showing actual prices and the difference.

Chart Analyst is easy to install, and its menus are simple and clear. The charts are detailed and easy to read. Although the screens are not difficult to follow, the program is complex enough that you must follow the instructions in the manual very carefully.

Marketing efficiency, fine-tuned financial management, and tight production controls are critical variables for a



Chart Analyst
Professional Farm Software
219 Parkade
Cedar Falls, IA 50613
(319) 277-1278
List Price: \$275

Requires: 128K RAM, two disk drives, IBM Color/Graphics Adapter, printer, high-resolution graphics monitor.

CIRCLE 800 ON READER SERVICE CARD

farmer's success. The growing complexity and reduced profit margins in today's agriculture make it more critical than ever for farmers to carefully manage their financial and production data.

An On-line Model Farm

Many progressive farmers have already computerized their financial and crop records. Computerized crop management seems to be the next logical step.

Farmprofit Plan Crop Model is a spreadsheet program consisting of a series of linked templates that join to form a complete farm model.

Crop Model lets you do "what if" planning for the financial operation of the farm as a whole. For instance, if you decide to cash rent additional ground, you would plug necessary information into the computer, such as the number of acres, rent amount, and yields expected from crops you plan to grow. The computer uses the formulas built into the dedicated financial

Crop Model's importance as a decision aid is clear when you see what it takes to perform the same calculations manually. For instance, if you change operating interest, the program makes 125 changes on the spreadsheet; if you change the percentage that goes to the farmer in a sharecrop agreement, the spreadsheet undergoes 403 changes.

Crop Model is divided into acreage planning, crop marketing, expense planning, monthly crop costs, monthly crop revenue, capital receivables, capital payables, capital sales, capital purchases, and nonfarm income and expenses. "What if" plans can be reviewed in summary, as part of a profit analysis, or in income-statement format. You can even get a spreadsheet analysis of break-even crop production.

A major constraint in this program is its small capacity, particularly the limitation to 3 crops. You can, however, overcome this and other capacity limitations by combining multiple models. The company claims that a new 12-crop model is in the works.

The *Crop Model* documentation is among the best I've seen. The tutorial section, in particular, is a model of clarity. Even a novice should be able to operate it easily, and spreadsheet buffs will be able to learn *Crop Model* that much faster.

The sample farm data that comes with *Crop Model* is relevant and complete enough to give you a thorough sense of the program's potential. Unfortunately, though, as in most regionally developed farm software, *Crop Model's* sample data is localized. Even the structure of the program is designed for a typical Midwestern cash grain operation, although the program, appropriately modified, would be as welcome in the apple orchards of Washington or the almond groves of California.

Crop Model's error handling is excellent. Each time I fouled up, I got an eye-catching prompt line that explained my errant behavior and set me on the straight and narrow path. All entry and formula

cells are protected, so you can't do any real harm.

Crop Model is only as good as the information you give it, so it won't replace crop record keeping or eliminate the need

Designed for a
Midwestern cash
grain operation, the
program would also
be welcome in the
apple orchards of
Washington.

for a comprehensive enterprise accounting system. In fact, when linked with a good accounting program, *Crop Model* provides a natural and effective framework for actual versus projected or previous-year budget analysis.

Combined with good record keeping, *Crop Model* is a winner. It is comprehensive and requires substantial data entry—about 4 hours' worth—but once the information has been gathered, entered, and analyzed, the program can't help but make a farmer a better manager.

Crop Model's strongest suit is its capacity to generate a crop budget to help you plan your cash flow needs in advance. If the price were slightly lower, this program would be a must for every farmer and agricultural lender with a PC.



Farm Profit Plan Crop Model
Brubaker and Associates
116 West Main St.
Delphi, IN 46923
(317) 564-4348
List Price: \$645

Requires: 256K RAM, one double-sided disk drive.

CIRCLE 799 ON READER SERVICE CARD

Farmprofit Plan Crop
Model is a
spreadsheet
program that forms
a complete farm
model.

model to show the month-by-month impact of that decision for the entire year. You see what happens to operating debt, operating interest, crop inventories, fertilizer expense, and income.

You can then change the scenario—for instance, lower the rent and modify crop yields upwards—to get a new result. The program shows you the effect of your choices on the farm as a whole. The ability to look at each previous result on the screen and match it against the current figure in that category lets you compare alternatives as you go.

LAST YEAR I MADE OVER \$100,000 SELLING SOFTWARE

THIS BOOK WILL TELL YOU HOW I DID IT!

HOW TO MAKE OVER \$100,000

Last week I sold over \$6,000 worth of software. I am a one man software company. On the average I make over \$3,000 profit every week. In the past month, I have received at least \$600 in the mail every day. It took only 12 months for sales of my programs to reach \$20,000 per month, yielding over \$10,500 profit monthly.

You don't have to be a computer wizard to make over \$100,000 per year writing software. Every program I wrote is in IBM BASIC. The key to making money is writing programs that you or a publisher can market profitably.

I sell my software by direct response advertising. There are several advantages to selling your software through direct response advertising:

1. Total Control of the Marketing
2. You do not have to sell to distributors or retailers
3. Low Initial Investment
4. You can try out an advertisement for a few hundred

WHAT THIS BOOK CAN OFFER YOU

You are getting information in this book that will enable you to make one thousand dollars or more every week. I had to learn the hard way. There are a few books covering the software business. Unfortunately, most of them are written by authors who have not been in the industry. I made a few mistakes that cost me thousands of dollars and months of work. This book can help you avoid making the same mistakes.

1. Dollars: One of my successful advertisements that now earns me over \$1,000 weekly started with a \$190 advertisement.
2. Repeatability and Expandability: If you have an advertisement that sends you money the first time, you can repeat the advertisement every month and run the ad in other magazines.
3. The ability to market specialized software

HOW TO TELL WHICH PROGRAMS TO MARKET

About every other week someone brings me a program that they have spent months working on. Some of them are excellent programs, and some that because they write a program better than the current best seller the world is going to be a gift to their dog.

If you are going to spend \$4,000 per month on advertising for a program you have to make more than \$4,000 in sales. It doesn't matter if your program is hand-coded in assembly language or if it is 4 times faster than the current best seller. If you cannot sell over \$4,000 worth of programs you are not going to make a dime. The same is true even if you spend only \$500 advertising each month, but receive only \$500 in sales. The same thing is true even if you get a publisher to publish your program. If a publisher cannot make more from a sale of your program than his costs, he is going to drop your program fast.

To determine what type of programs sell I went through every issue of PC and PC World for the past year. Software publishers naturally repeat the advertisements for profitable programs and discontinue advertisements for unprofitable ones. Putting the successful ads in one group and the unsuccessful ones in another group it became obvious that the successful programs had several things in common. The unsuccessful programs had different things in common. While no software has a 100% chance of being successful, following my advice will at least give you a very good chance of being successful.

WHY AM I GIVING AWAY THE TRAQUE SECRETS

You might wonder why I am giving away secrets that would increase competition. Quite frankly, there are more opportunities out there than there are people willing to take them. Of the programs that sell over \$100,000 volume range each year there is naturally a lot of competition to be the next Lotus or the next Ashton-Tate. Of the programs that sell in the 1 to 2 million dollar volume range there are fewer people writing programs for these markets. However, for programs that can only sell \$50,000 to \$100,000 each year there is a lack of people writing software for these "small" markets. To sell \$100,000 worth of software you only have to sell two thousand packages. Then ten per day at fifty cents each or just one program a day at \$200 each. While only word processors, databases, and spreadsheets have the mass appeal to sell millions of copies, there are thousands of possible programs in specialized fields that can sell one copy a day. The opportunities in the specialty software field are so great that it does not make any sense to compete with someone who already has the market when you can find your own niche and have it all to yourself.

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What they have in common.

Notice what software is here.

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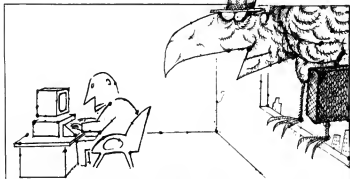
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Tax Plan Models

Tax attorneys do more than just fill out returns. They guide business decisions according to their tax consequences. Electronic spreadsheets build models that make the job easier.



Perhaps the most telling difference between tax lawyers and accountants lies in their annual deadlines. On April 15, accountants will be tearing out any remaining hair and madly sending surrogates to wait in line at the post office for the coveted postmark. For tax lawyers, D-Day was December 31, the last day a transaction can be considered part of the previous calendar year's return.

That difference reflects the accountant's primary interest in getting his clients' tax returns filed and the tax lawyer's often exclusive fascination with the tax ramifications of a particular transaction. It also means the recent explosion of tax-related software has been of use mainly to the accountants. Most tax

packages have one objective—computing the taxes owed by a particular individual or taxable entity.

Strangely, the bottom line of a tax return is rarely of primary interest to the tax lawyer, who typically structures a proposed deal without regard to the other income and deductions of the client.

Of course, tax lawyers can't really afford to ignore the bigger picture. Without an appreciation of how one deal relates to others already made by the client, incremental analysis may not reflect the ultimate result.

Help for Lawyers

These deals, such as minimum tax computations, and other complex calculations, such as multiyear income aver-

aging, are where the tax analysis software packages really show their colors. The state of the art for the computerized tax lawyer is the *BNA Income Tax Spreadsheet*. (A full review of this package appears in the Tax Planning section of this issue's cover story.) Produced by a respected publisher of tax research materials, the *Income Tax Spreadsheet* is the first entrant in a promised series of financial planning software from BNA that will eventually include packages for estate tax, corporate tax, and real estate investment.

As the name implies, the *Income Tax Spreadsheet* is formatted in the columns and rows familiar to users of electronic spreadsheets such as *1-2-3*. Menu-driven and designed for computer neophytes, the package is impressively easy to master. Its worksheets closely follow the IRS schedules and allow you to "push down" into subworksheets that detail the components of items such as ordinary income or net long-term capital gains and losses.

The Custom Solution

Despite these advances in dedicated software, most big law firms primarily use custom-designed software. Holme Roberts & Owen, a 180-lawyer firm in Colorado, has found that calculating the tax ramifications of a proposed business



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arrangement requires a model of the transaction itself, not just the tax attributes. For example, electronic spreadsheets are invaluable in structuring new partnerships, a favorite business vehicle because of their ability to pass tax attributes directly to the investor.

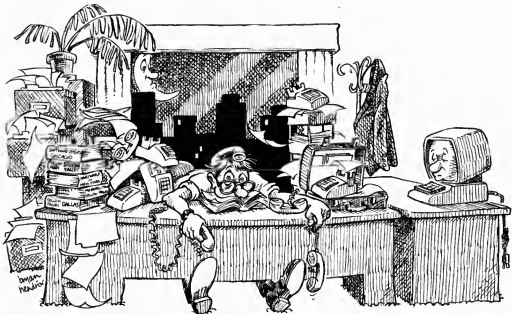
Suppose your firm represents an oil and gas development company with a successful track record of buying oil leases and producing the minerals. Several investors are ready to put up most of the capital for a new drilling operation and are willing to give your client a disproportionate share of the proceeds in return for its expertise and experience in operating such properties.

The IRS allows disproportionate allocations of partnership interests, but only if final distributions respect the "capital account" of each partner. Before the age of personal computers, you probably would have made an attempt to manually estimate the capital accounts over the life of the property, a laborious process often subject to computational errors. Sophisticated spreadsheets such as 1-2-3 and Symphony make the process quick, accurate, and flexible. You load your assumptions (sharing ratios among partners, depreciation on equipment, and expenses) at the beginning of the spreadsheet. In Symphony, you could assign one window to assumptions; another to the subcomputations required for tax purposes, such as cost depletion on each year's production; and a third window, keyed off the other two, to calculate the capital accounts at the end of each year.

What If

Once structured, the spreadsheet acts as a model of the proposed transaction. The model's power lies in its ability to change assumptions and compute the results—the classic "what if" situation: What if you change the sharing ratios? Lengthen the useful life of the equipment? Add partners? A well-structured spreadsheet answers these questions at the push of a button.

(continued)



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(Calif. continued from Vol. 4 No. 6)

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Valley Computer Club
P.O. Box 6545
Burbank, CA 91510-6545

Santa Barbara IBM PC Users Group
c/o Erik N. Pedersen
1622 Loma St.
Santa Barbara, CA 93103
(805) 965-7376
(805) 969-4788

San Marino IBM User Group
c/o Christopher Chichester
P.O. Box 80074
San Marino, CA 91108-8074
(818) 289-7778

Monterey Bay Users Group-IBM PC
Bill Kinard, president
177 Webster St., Suite A-354
Monterey, CA 93940
(408) 373-6245



IBM User's Club
c/o Susan Shalit, Glendale Federal Savings
24211 Calle de la Louisa
2d floor, community room
Laguna Hills, CA 92653
(714) 859-0503

COLORADO

Denver User Group
c/o Steve Leibson
4040 Greenbriar Blvd.
Boulder, CO 80303
(303) 494-4062

PC Users' Group of Colorado
c/o Howard Weissman
P.O. Box 944
Boulder, CO 80306
(303) 443-5528 (evenings)

Colorado Springs PC Users Group
c/o Cleveland Bell
P.O. Box 16256
Colorado Springs, CO 30935

Front Range PC User Group
c/o Joan Brown
813 Engleman Pl.
Loveland, CO 80537
(303) 667-6059

CONNECTICUT

Connecticut IBM PC Users Group
c/o Davis Foulger
P.O. Box 291
New Canaan, CT 06840
(203) 744-4002

IBM PC Club
c/o Colette B. Squires
P.O. Box 545
Storrs, CT 06268

PC will publish a periodic listing of PC user groups. Send new addresses or address changes to "Club News," PC, One Park Ave., New York, NY 10016. New groups and address changes are shown entirely in **boldface**.

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Trumbull PC Users Group

P.O. Box 545
Trumbull, CT 06611

Central Connecticut User Group

c/o Rich Paterson
ComputerLand
131 S. Main St.
West Hartford, CT 06110
(203) 561-1446

c/o Catherine Winslow

P.O. Box 180
Mystic, CT 06355
(203) 889-2540

Yale Medical School IBM PC User Group

c/o Philippe Jeanty
School of Medicine
333 Cedar St.
P.O. Box 3333
New Haven, CT 06510
(203) 785-2173

The UConn PC Club

P.O. Box 542
Storrs, CT 06268-0542

DELAWARE

PC Professional Users Group

P.O. Box 2350
Wilmington, DE 19899

DISTRICT OF COLUMBIA

IBM PC Special Interest Group

4910 43d St., N.W.
Washington, DC 20016

Financial Institutions Users Group of the D.C. Metropolitan Area

c/o Gary Eiserman
First American Bank, N.A.
740 15th St., N.W.
Washington, D.C. 20005

FLORIDA

IBM Personal Computer Users' Group

c/o Wyatt Bell
The College of Boca Raton
3601 N. Military Trail
Boca Raton, FL 33431

USF IBM PC (MS-DOS) User's Group

University of South Florida
4202 E. Fowler Ave., SVC 409
Tampa, FL 33620

Manasota IBM-PC Users' Group

c/o Richard Reynolds
2204 Palma Sola Blvd
Bradenton, FL 33529
(813) 792-5400

I.B.M. & Compatible Computer Club

P.O. Box 5306
Jacksonville, FL 32207-5306

South Florida Computer Group

c/o Richard Stryick
7040 S.W. 7th Street
Plantation, FL 33317
(305) 584-4141

Space Coast PC User Group

c/o John Key
1540 Monte Carlo Court
Merritt Island, FL 32952

Central Florida Computer Society IBM/MS-DOS Special Interest Group

c/o Nick Konya
P.O. Box 639
Goldenrod, FL 32733
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2775 Luna Ct.
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Pinellas Park, FL 33565
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Miami PC User Group, Inc.

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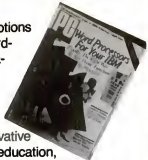
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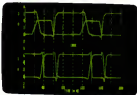
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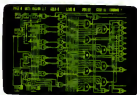


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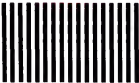
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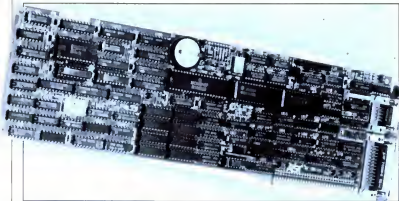
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N. Atlantic Industries, Inc.
60 Plant Ave.
Hauppauge, NY 11788
(516) 582-6060

CIRCLE 736 ON READER
SERVICE CARD



MonoGraphPlus Board, AST Research, Inc.

Sony Color Monitors

Two IBM PC plug-compatible RGB color monitors employing Sony's Trinitron circuitry with dot-pitch resolutions of 0.25 millimeters (compared to the 0.38-millimeter resolution of the standard IBM RGB monitor). The two models, CPD-9000 (9-inch)

and CPD-1201 (12-inch), offer 25- by 80- and 25- by 100-character displays, respectively.

The tilt-and-swivel mounted monitors also feature a horizontal shift control. This allows the monitor to center graphic displays automatically without requiring the user to reprogram the image to fit the screen.

The pixel resolutions of the CPD-9000 and CPD-1201 is 640 dots by 240 lines and 800 dots by 240 lines, respectively.

(List Price: CPD-9000, \$550; CPD-1201, \$595)
 Sony Communications
 Products Co.,
 Sony Dr.,
 Park Ridge, NJ 07656
 (201) 930-6432

CIRCLE 735 ON READER
 SERVICE CARD

SOFTWARE

QuickCode-III

A program generator for dBASE III, featuring a "jumbo file" capability allowing the user to create data files three times the size of normal dBASE III files. QuickCode-III permits the creation of data files with as many as 1,000 fields and 32K bytes per record.

Other features of the program generator include on-screen field calculations, a Report Library for sorted reports, and an ex-



Periscope, Data Base Decisions

tensive on-line help facility.

(List Price: \$295)

Requires: 256K RAM, two disk drives, PC-DOS, dBASE III.

Fox & Geller, Inc.,
 604 Market St.,
 Elmwood Pk., NJ 07407
 (800) 221-0156
 (201) 794-8883
 Telex: 96-8948

CIRCLE 734 ON READER
 SERVICE CARD

Periscope

A symbolic debugging system supporting assembly, BASIC, C, and Pascal programming languages. Periscope includes a special plug-in memory board with a hardware-based "break-out" switch, permitting the program developer to interrupt the execution of a pro-

gram and enter the debugger, even if the user's system is hung by the application.

The debugger is command-driven, with a command structure similar to the standard PC-DOS debugger. Features of this debugging system include:

- Full support of symbols, allowing the user to use names instead of addresses that may change with each compilation of the program. Symbols are read from the link MAP file and can be redefined or added while the debugger is active.

- Preservation of program screens, even on systems with one monitor. Dual-monitor systems can use one monitor for program screens, with the oth-

er showing Periscope's debugging editor.

- Support for up to 16 breakpoints, plus register and memory breakpoints used to monitor changes.

- Memory displays in word, double word, and record formats. The record format labels each field within a user-defined record, simplifying the reading of a complex data structure.

- Hexadecimal arithmetic functions, with hex-to-decimal and decimal-to-hex conversions.

- A special trace mode that jumps to the next instruction at the same level—useful for extracting subroutine calls and interrupts at full execution speed.

- Global search facilities for locating all instructions that reference a given address or data item.

(List Price: \$295; demo disk, \$5)

Requires: 64K RAM, one disk drive, PC-DOS.
Data Base Decisions
 14 Bonnie Ln.,
 Atlanta, GA 30328
 (404) 256-3860

CIRCLE 709 ON READER
 SERVICE CARD

General Engineering Software

A software package with more than 50 programs for engineers, technicians, and others involved in solving problems relating to ma-

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SOFTWARE

chine tools and manufacturing systems. Areas covered include general engineering calculations, heat exchanger routines, hydraulics and fluid power, and assembly line design/structural engineering.

The programs are also available separately. Each performs a single or a series of routines for solving a specific type of engineering problem.

(List price: Package, \$195; individual programs, \$15 to \$29)

Requires: 64K RAM, one disk drive, PC-DOS.

Unik Associates

12545 W. Burleigh
Brookfield, WI 53005
(414) 782-5030

CIRCLE 732 ON READER
SERVICE CARD

Bookmaker

Print-formatting software permitting the user to print books, newsletters, journals, and so forth from ASCII text files created by any word processing program. *Bookmaker* consists of the following three BASIC program modules: *MAKEBOOK.BAS* is used to convert a manuscript file into book format; *READBOOK.BAS* reads the book file created by the first module; and *PRINTBK.BAS* allows the book file to be printed.

Features of the software include forward or backward paging, printing of

all or selected portions of the book file, and the ability to print books of virtually any length from partial files stored on many disks.

The components are available separately or as a complete system.

(List Price:

MAKEBOOK.BAS, \$69.95;

READBOOK.BAS, \$29.95;

PRINTBK.BAS, \$49.95;
all three, \$130)

Requires: 128K RAM,
two disk drives, PC-DOS,
BASICA, ASCII word
processor.

Micomex, Inc.

P.O. Box 255

Chandler, AZ 85224

CIRCLE 731 ON READER
SERVICE CARD

Learn to Type

A typing tutorial offering 25 structured lessons for learning a keyboard.

Learning to Type teaches the use of both the QWERTY and Dvorak keyboard layouts.

(List Price: \$39.95)

Requires: 64K RAM, one disk drive, PC-DOS.

Arrays, Inc./Continental Software

11223 S. Hindry Ave.
Los Angeles, CA 90045
(213) 410-3977

CIRCLE 730 ON READER
SERVICE CARD

TenCORE

An authoring system for developing computer-based training programs. Designed for use by educators, industrial trainers, and professional courseware developers, *TenCORE* provides enough capability in its programming language to allow the

user to create large programmed learning systems and simulations.

Features of the authoring system include user-definable character sets; source, graphics, and character set editors; external device interface; an on-line reference system; and support for light pens, digital mice, and the 8087 floating point processor. Other capabilities offer the user a means of tracking student rosters and performance records.

(List Price: \$2,000)

Requires: 192K RAM,
two disk drives, PC-DOS,
color/graphics adapter.
Computer Teaching Corp.
1713 S. Neil
Champaign, IL 61820
(217) 352-6363

CIRCLE 729 ON READER
SERVICE CARD



TenCORE, Computer Teaching Corp.

Legal Systems Software

A line of software that relates to specific areas of law in four states: California, Illinois, Texas, and New York. Unlike legal administrative software (such as time and billing, law office management, and similar programs for law practices), the *Legal Systems Software* offerings cover the drafting of legal documents and procedural details involved in various areas of the law.

Among the programs offered in the series are, by state:

- California—*Wills and Trusts, Domestic Relations, Corporations, Probate, Real Estate, and Personal Injury.*
- Illinois—*Wills and Trusts, Domestic Relations, and Corporations.*
- Texas—*Family Law, Wills and Trusts, and Corporations.*
- New York—*Dissolution of Marriage.*

Each of the above software systems provides both written materials (such as sample letters, motions, affidavits, checklists, procedural guides, and so forth), and materials on disk from which to draw boilerplate texts that meet legal criteria in the named states. The disk-based materials are designed to be used with the *WordStar* word processing system. The



Word Image Processing System, Datacopy Corp.

programs speed the creation of original documents tailored to the individual needs of an attorney's clients.

(List Price: \$1,595 each)

Requires: 128K RAM, two disk drives, PC-DOS, *WordStar*.

Matthew Bender & Co., Inc.

235 E. 45th St.
New York, NY 10017
(212) 689-0930

CIRCLE 728 ON READER SERVICE CARD

Word Image Processing System (WIPS)

Graphics software for the IBM PC-XT, allowing images and text to be merged for printing or display. Used with the manufacturer's line of digitizing cameras and graphics scanners,

WIPS acts as a command shell between the user's own word processing and database management applications and the graphics equipment. Input is inspected by the shell, then is passed on to the target applications program. The shell filters output from the applications to either the display or printer, inserting image files in the appropriate places within the text.

Image input devices supported by *WIPS* include the Datacopy Model 610 Electronic Digitizing Camera and the Model 680 Graphic Scanner. These interface to the user's IBM PC-XT via the Datacopy Model 110 Image Processing Interface. *WIPS* can interface with such applications programs as *Volkswriter De-*

lux, Microsoft's *Word*, and Lotus's *1-2-3*.

Various types of image manipulation are provided by the software. Images of line drawings or pictures up to 11 by 14 inches, and small three-dimensional objects can be captured at resolutions of up to 200 dots per inch. Pictures containing gray scale can be half-toned during processing, simulating gray scale when displayed on a monochrome monitor or printout. Once captured, images can be reduced or enlarged, rotated, displayed as a complete image in lower resolution, or zoomed to high resolution over a portion of the image (which can be scrolled up or down for detailed viewing of the complete image). Images can also be stored—compressed or uncompressed—and small portions of the image can be copied for separate storage, display, or printing. (List Price: Available from the manufacturer)

Requires: 256K RAM, 10 MB hard disk, PC-DOS 2.x, color/graphics or Hercules monochrome graphics board, Datacopy graphics hardware.

Datacopy Corp.
1215 Terra Bella Ave.
Mountain View, CA 94043
(415) 965-7900
Telex: 70-1994

CIRCLE 727 ON READER SERVICE CARD

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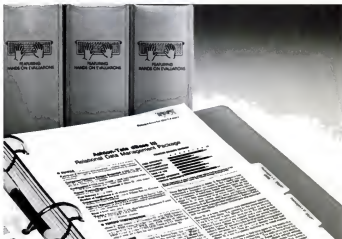
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Director of Marketing, DS Agency Inc.
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Phone (____) _____

MATH SCHOOL

A user-supported educational program providing drills in arithmetic problems. **MATH SCHOOL** incorporates two main program components; the first drills the student on 36 different types of arithmetic problems. Each session gives a random selection of problems in one of three user-selected difficulty levels, with or without timing. Results of the drill are automatically analyzed and compared with the last ten scores on the same type of test. Best scores are saved to disk.

The second major area of **MATH SCHOOL** provides immediate tutorial feedback as answers are entered on a drill. If the response is incorrect, the program shows the correct answer and offers the user an opportunity to study the problem's solution.

(List Price: \$15)

Requires: 64K RAM, one disk drive, PC-DOS. **Stillwell Software Products** 16403 N. 43d Dr. Glendale, AZ 85306

CIRCLE 726 ON READER SERVICE CARD

ChessWright

A chess program featuring menu-driven operations, seven distinct skill levels, and a choice of move entry modes. Moves can be entered via the arrow cursor control keys or in chess

notation. If the latter entry style is chosen, **ChessWright** allows either algebraic (D7-D5) or descriptive (QP-Q4) notation.

Games can be saved on disk in readable form and restored later for study or replay. A digital clock keeps track of time moves. Also, the game board can be inverted on-screen at any time during play for board study or convenient perspective. In addition, moves made in error can be taken back instantly.

ChessWright can be played on systems with or without graphics adapters.

(List Price: \$50)

Requires: 164K RAM for PC-DOS 1.1, 128K RAM for PC-DOS 2.0, one drive.

SoftWright Systems
P.O. Box 3208
Durham, NC 27705
(919) 383-4441

CIRCLE 725 ON READER SERVICE CARD

Personal Inventory Systems

A series of low-cost inventory systems allowing a user to maintain personal property records and to print reports in a variety of sorted orders. Specialized versions of the program are available for the following categories: Household Property; Coins and Stamps; Paintings, Drawings, and Prints; Photographs; Books and Manuscripts; Comic Books and Magazines; Records, Tapes, and Videos; Figurines and Plates; and General Collectibles.

All of the systems include the following data fields: Item Number, Location Code, Description, Purchase Date, Purchase Cost, Estimate Date, and Estimate Value. In all versions, reports of the entire inventory file may be sorted and printed by any of the fields. Additional spe-

cialized reports are available within each of the versions.

The menu-driven programs are offered complete with source code, a worksheet form, and instructions for use.

(List Price: Each system, \$29.95)

Requires: 64K RAM, one disk drive, PC-DOS.

RDM Computer Services Co.
P.O. Box 23
Staten Island, NY 10301

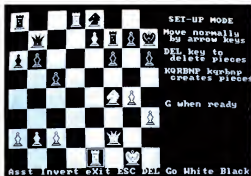
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Program 101

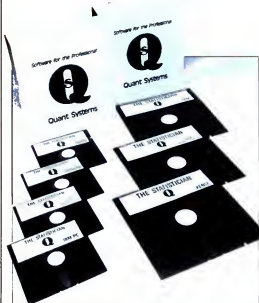
A program simplifying the preparation of design patent, trademark, and copyright applications for filing with the U.S. Patent and Trademark Office. The menu-driven program incorporates the Standard Copyright form, as required by the U.S. Registrar of Copyrights, and other standard forms. Printed instructions, as well as on-screen prompts, guide the user in filling out the form.

Data is stored for repeated use and can easily be updated as needed. When an application is complete, the program can print out forms ready for filing.

The three components of the software (for patents, copyrights, or trademarks), are available separately or together on a single disk.



ChessWright, SoftWright Systems



The Statistician, Quant Systems

(List Price: Separate components, \$49.95; combined, \$99.95)

Requires: 64K RAM, one disk drive, PC-DOS. PTC Forms Co. 15 Steuben Dr. Jericho, NY 11753 (516) 938-1929

CIRCLE 723 ON READER SERVICE CARD

The Statistician

A new release of Quant Systems's statistical forecasting and analysis program offering correlation and cross-tabulation analysis functions. Also included is a multiple-regression component (including stepwise, ridge, backward elimination, and all subset procedures), as well as

nonparametrics, time-series analysis, descriptive statistics, x/y plots, random variate generation, data transformations, integral database with conditional search and multiple field sort, and survey research processing abilities.

The x,y plot functions can create plot files compatible with many word processing programs.

(List Price: \$299; XENIX version, \$599)

Requires: 128K RAM, one disk drive, PC-DOS or XENIX.

Quant Systems
P.O. Box 628
Charleston, SC 29402
(800) 334-0854, ext. 814
(803) 571-2825

CIRCLE 722 ON READER SERVICE CARD

Cover Your Ascii

An ASCII file-protection program that encrypts dBASE II source code. Unlike encryption programs that require a file to be decrypted prior to actual use, *Cover Your Ascii* allows both dBASE II and DBRUN (the RunTime version of dBASE II) to execute the encrypted file. Furthermore, it allows the user to establish passwords to create unique encryptions at any time.

Cover Your Ascii has a built-in code optimizer that reduces the ASCII source file size and enhances program performance. Also, the encrypted program can be used with a ProLok diskette to protect against unauthorized copying of the developed applications program.

(List Price: \$475; code optimizer alone, \$100)

Requires: 128K RAM, two disk drives, PC-DOS. Lake Avenue Software 77 N. Oak Knoll, #105 Pasadena, CA 91101 (818) 792-1844

CIRCLE 721 ON READER SERVICE CARD

X-CELL

A database management system with the ability to define fields for any combination of alphanumeric and numeric entries. Numeric fields can be defined by linear and nonlinear functions of other numeric

fields. Field names can be up to 30 characters long, and up to 30 fields can be defined per record. The total number of records is limited only by available disk space.

X-CELL includes a report-generating facility with two format types: Memo, for form letters and other fill-in-the-blank-style documents; and Header, which provides columnar reports. The Header facility also performs summations and averages of numeric columns.

There is no limit to the number of data files that can be created and accessed via menus. Documentation generated for each created database file includes field definitions, their titles and lengths, and examples of all report formats defined for each database. Also included in the documentation are all of the mathematical equations used to define numeric field entries.



Cover Your Ascii, Lake Avenue Software



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SOFTWARE

(List Price: \$175)

Requires: 64K RAM, one disk drive, PC-DOS.

Index Services

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Taunton, MA 02780

(617) 822-3173

CIRCLE 720 ON READER
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STARplus

An enhancement program for use with the popular *WordStar* word processing software. *STARplus* assigns a battery of 60 multiple-keystroke commands to the IBM PC's ten function keys. It displays up to 11 different function-key legends on-screen on line 25, permitting the user to move up or down through the various legends, automatically redefining the ten function keys as each new legend appears on the screen.

As an additional convenience, *STARplus* provides an on-screen CapsLock indicator. It also redefines the Home, End, PgUp, PgDn, and cursor movement keys to streamline *WordStar* operations. (List Price: \$119)

Requires: 64K RAM, one disk drive, PC-DOS, *WordStar*.

Apelron Software Corp.

57 Sena Plz.

125 E. Palace Ave.

Santa Fe, NM 87501

(505) 984-8165

CIRCLE 719 ON READER
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Hurricane Tracker

A program for tracking hurricanes and tropical storms. It accepts input of a storm's latitude and location as reported by the National Weather Service and then makes computations to determine the storm's course, forward speed, distance from any point of landfall, and other important parameters.

Output comes in the form of tables and high-resolution maps, which can be printed on any printer with graphics capabilities. Also included with the software are data files with data on major storms that have struck the United States in the recent past. Their tracks can be displayed alongside new storms for comparison. (List Price: \$39.95)

Requires: 128K RAM, one disk drive, PC-DOS, color/graphics adapter.

Climate Assessment Technology, Inc.

11550 Fuqua, #525

Houston, TX 77034

(713) 484-3603

CIRCLE 718 ON READER
SERVICE CARD

Dental Business System

A dental practice management system for doing accounts receivable and practice analysis. The menu-driven system features a light pen interface for data entry, help screens,

and a training mode.

Patient treatment plans are entered into the computer by touching a list of ADA codes on the screen with a light pen. Other entries that can be made by light pen include patient record updates, patient billing and accounts receivable, and the automated generation of standard ADA insurance forms.

Other features of the *Dental Business System* include insurance estimates, delinquent accounts and aged insurance reports, walkout statements with insurance estimates, finance charges, medical records,

pie charts and bar graphs for practice analysis, daily transaction and income reports, and simple word processing with mail-merge facilities.

The complete program package includes a PC-compatible light pen. (List Price: \$4,800; full demo with light pen, \$450; mini demo, \$35)

Requires: 192K RAM, one disk drive, PC-DOS, light-pen interface.
Cobb Dental Systems, Inc.
Rt. 3, Box 182M
Waxham, NC 28173
(704) 843-5109

CIRCLE 717 ON READER
SERVICE CARD



Dental Business System, Cobb Dental Systems, Inc.

PC*CLAIM

An inexpensive office management program for physicians designed to simplify paper claims preparation and speed settlements for services performed. The software submits claims to participating insurance companies—including Blue Cross/Blue Shield, Medicare, and a number of private insurance firms—by sending the prepared forms through the General Electric teleprocessing network.

PC*CLAIM uses the American Medical Association's Form 1500 as its model for data entry screens and can print data onto this form as needed. Also available from the software's producers are modules for specific medical specialties and diagnoses.

(List Price: \$89.95)
Requires: 256K RAM, two disk drives, PC-DOS.
Physicians Practice Mgmt., Inc.
 1810 S. Lynhurst, #Q
 Indianapolis, IN 46241
 (800) 428-3515
 (800) 792-3525 in Ind.
 (317) 248-0357

CIRCLE 716 ON READER SERVICE CARD

AEC Spelling

Educational software to teach spelling in grades 2 through 8. The *AEC Spelling* series teaches the correct spelling of over 4,000

of the most-commonly used English words. Additional words can be added by the user to extend the stored vocabulary.

AEC Spelling utilizes a test/teach/test approach effective for teaching its subject. Words are grouped into lists based on common spelling generalizations, such as "i before e except after c." A pretest is used to eliminate words the student spells correctly. Words spelled incorrectly become the subject matter for subsequent study sessions. A post-test is given after study is completed, indicating the student's progress.

Spelling tests are administered by means of a ta-

chistoscope, which flashes the study word on the display long enough to permit recognition, but briefly enough to prevent visual memorization. Other techniques used in the study sessions include visualization exercises, identification of misspelled words in sentences and word lists, and alphabetized lists of study words.

(List Price: Each grade level, \$39.95)

Requires: 64K RAM, one disk drive, PC-DOS.
American Educational Computer, Inc.
 2450 Embarcadero Way
 Palo Alto, CA 94303
 (415) 494-2021

CIRCLE 715 ON READER SERVICE CARD



AEC Spelling, American Educational Computer, Inc.

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Also included are detailed data on each corporation's stocks and bonds outstanding, the company's CUSIP numbers, and ticker symbols.

Standard & Poor's Corp.
 25 Broadway
 New York, NY 10004
 (212) 208-8692

CIRCLE 714 ON READER SERVICE CARD



Global CRT Shuttle, Global Computer Supplies

ACCESSORIES

Global CRT Shuttle

An adjustable, two-component PC stand that allows as many as four persons to share a single PC system. The Global CRT Shuttle consists of a steel CPU floor stand and an adjustable, swinging "arm" capable of supporting a CRT weighing up to 120 pounds. The system's keyboard is plugged into the arm, instead of the CPU.

The PC Shuttle arm can be ordered with either a dual-knob "C" clamp for mounting onto a desk edge, or with a flat mounting plate. The monitor's power and data cable cords are supported with fully shielded industrial-grade connectors.

(List Price: \$299)

Global Computer Supplies
45P S. Service Rd.
Plainview, NY 11803
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(516) 292-3400

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PUBLICATIONS

Computer Programming for the Compleat Idiot

A programming handbook that guides the reader through a practical demonstration program for a major application, showing how the functions and routines taught can be used in other applications.

Computer Programming for the Compleat Idiot, by author Donald McCunn, also provides a valuable checklist to help the reader determine if the target application tasks are suited to computerization.

(Cover Price: Cloth, \$18.95; Paper, \$10.95)
Design Enterprises of S.F.
P.O. Box 14695
San Francisco, CA 94114
(415) 282-8813

CIRCLE 712 ON READER
SERVICE CARD

dFASTER.dBETTER

A guide to making dBASE II run faster.

dFASTER.dBETTER, by

author R. David Dornbusch, contains the source code for a program, dPROCESSOR, that reformats dBASE II command files to make them smaller and faster. Also covered in the book are tested techniques for improving dBASE II command file performance.

Also available is an optional disk containing the dPROCESSOR utility and the benchmark tests used by the author to develop the techniques described in the book.

(Cover Price: \$35; Optional Disk, \$60)

Micro db Systems
P.O. Box 2380
Midland, MI 48640

CIRCLE 711 ON READER
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Word Processor Comparison Tables

A feature-by-feature comparison of 35 word processing programs. *Word Processor Comparison Tables* compares 139 selected features of the word processing systems and provides guides to selecting appropriate software for a given application. Also covered are suggestions for training personnel and checklists to complete before purchasing each component of a complete word processing system.

(Cover Price: \$39.95)

Information Research
10367 Paw Paw Lake Dr.
Mattawan, MI 49071
(616) 668-2049

CIRCLE 710 ON READER
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New on the Market Submission Guidelines

1. Please include the retail price, distribution methods, and details of both hardware and software requirements needed for an end-user to properly use your new product. For software especially, this includes required amount of RAM, number and type of disk drives, operating system(s) supported, and any peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements for the product may be included, but in most instances we need more information about a product than is typically included in an ad.
3. Include telephone contacts for marketing and technical questions.
4. If available, include black-and-white glossy photos of the product, 4 x 5 in. or larger.

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PCjr.	D	K
3270 PC	E	L
XT/370	F	M
Other (specify)	G	N

3 For what, if any, business application(s) do you use the microcomputer you currently own?

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PCjr.	D	K
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XT/370	F	M
Other (specify)	G	N

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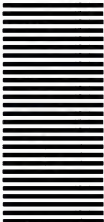
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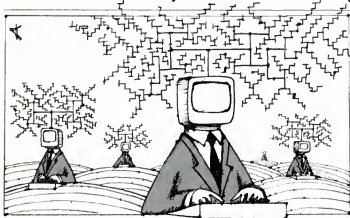
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munications software and manual that you need to take advantage of BCN are provided free of charge.

If you don't have a modem, BCN will sell you a Smartlink II package, which consists of a 1200-baud free-standing Hayes-compatible modem, a 1-year subscription to BCN (worth \$60), and a 3-month subscription to *Link-Up* magazine—all for \$199.95. The modem comes with a 30-day, money-back guarantee and a 2-year parts and labor warranty.

Databases Galore

BCN offers access to everything from Agnet, a database from the University of

Nebraska that tells you all about agriculture, to weather and sports reports from WSI. You'll also find such unique services as Billboard and Knight/Ridder's VU/Text as well as more familiar names, including CompuServe, DIALOG, EasyLink, NewsNet, and SDC's Orbit. The Dow Jones News/Retrieval Service, Mead Data Central's Lexis and Nexis, and a number of other systems are scheduled to be added in the near future.

Cost Savings

If you were to subscribe to all of these databases independently, you could easily spend \$3,500 a year, according to BCN. I did my own checking, and the lowest figure I could come up with is \$2,924. However, since database pricing has little conformity—some databases require advance deposits, some have monthly minimums, and start-up fees can range from zero to \$125—and costs can be calculated many different ways,



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both figures seem quite plausible.

A \$3,000 to \$3,500 savings makes for good press-release copy. But it's similar to offering a savings of thousands of dollars on a single-engine airplane—if there

BCN makes money by buying database time at wholesale rates and offering it to subscribers at the regular retail price.

isn't even a remote possibility that you would buy a plane in the first place, what good does it do you?

For most people, a \$500-a-year savings would probably be a more realistic figure. A small-business person, for example, could be expected to subscribe to, say, CompuServe's Executive Information Service (\$10 per month minimum), NewsNet (\$15 per month minimum), and BRS AfterDark (\$75 for start-up and \$12 per month minimum) for a total minimum cost of \$519 the first year.

Once you have connected with a service, you are charged the standard subscriber rate for the time you use. BCN makes money by buying database time at wholesale rates and offering it to subscribers at the regular retail price. The \$5-a-month fee covers 20 successful logons to any of its databases. Additional logons cost 25 cents each.

BCN rents account numbers from the on-line services, and each time you log on, you get a different one. If you are already a CompuServe subscriber, you can make arrangements to use your current account number whenever you sign on to that service. You can always send mail when accessing CompuServe via BCN, but you can only receive mail by using your own account number.

Accessing Databases

You can begin to access databases via

BCN as soon as you open your start-up kit, or you can wait to read the 100-page *Database Guide* that BCN sends to all new subscribers. This manual describes what's available on each service, provides instructions for ordering documentation that is produced by the databases themselves, and includes lists of connect-time charges for each database.

Logging onto CompuServe via BCN requires four keystrokes. You must type BCN to start a batch file that loads *SuperScout*, and then you enter a number from the BCN database menu that will soon appear. *SuperScout*, your PC, and your modem handle everything else.

When you use BCN for the first time, *SuperScout* takes you through the steps of filling out a customer profile and prompts you to enter the name of the largest city near your location. After verifying your credit card, BCN's main computer opens an account for you and, if need be, transmits the latest version of the *SuperScout* program to your machine. It also sends the latest copy of the BCN newsletter. These automatic updating procedures are free and are available each time you use BCN.

At your next request for a database from the BCN menu, the BCN main computer sends the phone number of the nearest Telenet or Tymnet node and the account number and password to get you onto your chosen system. Your system then takes over and automatically dials the nearby packet-switching node and logs you onto the database. I found that the logon process took about 1 minute and 24 seconds.

Utility Functions

Once you are on-line, BCN's *SuperScout* places 14 utility functions at your disposal. For example, the program's toggle functions let you save incoming information to memory, save it to disk, or print it out. And, regardless of the database you are using, you hit the Esc-E key sequence for the proper sign-off commands to log you off and return you

to the BCN menu.

Another BCN menu gives you access to DOS functions. You can call for a directory of a selected storage device, view a file, print a file, and erase or rename a file. There's even a crude but servicable line-oriented word processor. Files can be sent from memory or from disk. By selecting "manual modem operations," you can use *SuperScout* as a regular communications program. And there is a nine-entry *Personal Phone Book* or dialing directory you can use to contact databases, bulletin boards, and other *SuperScout* users.

A Few Hitches

BCN works smoothly, but no package is perfect. At this writing, for example, *SuperScout* supports only 300-baud communications. Bob Smith, BCN's vice-president of sales and marketing, says that a new version of *SuperScout*, written in C, is nearly ready and that it will support 1200 baud.

If you're a *CrossTalk* user and have set your modem's switches for that program, you may find it inconvenient to return them to the factory settings that *SuperScout* requires. Also, the BCN system does not currently use Uninet or CompuServe's ComLink network, so it may not provide the lowest-cost connection in every case.

A new version of SuperScout written in C will support 1200-baud communications.

Given the magnitude of what BCN has accomplished, these problems seem insignificant. I believe the only real problem you may encounter is coming to terms with the vast quantities of information BCN places at your disposal. ■

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Software at a Glance: Two New Catalogs

Looking through magazines to find new software in a given category or reviews of a particular program is chancy and tedious. Here are two catalogs that help you do the job.

Rummaging through computer magazines for software reviews can drive the most complacent computerphile to seek a lifetime membership in the radical diskburners society. One alternative to magazine review mania is shelling out a few bucks and buying a software catalog. Two new software catalog compendiums have emerged on the market. The first is Quantum Press/Doubleday's *Whole Earth Software Catalog* by Stewart Brand. The second is OMNI's *Complete Catalog of Computer Software*, edited by Owen Davies (Macmillan).

Ergonomic Reviewing

The *Whole Earth Software Catalog* (WESC) is not as ambitious a project as many of Stewart Brand's other information catalogs, most notably the two ac-

claimed *Whole Earth Catalogs*. It is certainly his most publicized. From the moment Doubleday advanced \$1.3 million dollars to Brand and his merry band of



computer pranksters, a watchful industry waited to see how the king of the alternative lifestyle catalogs would fare. Brand's magazine (*Whole Earth Software Review*) didn't survive its first season, leaving only this catalog to recoup the enormous cash advance.

The *Whole Earth Software Catalog* is less of a software review than a forum. Brand uses many reviewers with distinctly different voices. Rather than recap the

manufacturer's program description, the reviewers concentrate on their personal experience with a package. This approach makes sense. Opinions are what ultimately drive a consumer to separate *Framework* from *Symphony*. The problem is that these descriptions often leave the lay reader puzzled. Brand's catalog is for the "in crowd" who are already familiar with the packages. Often you'll get two reviewers looking at the same package and voicing the same sentiments in very different words.

Since there's so much emotional wooftin' and quackin' about the "feel" of a program, there's not much room left to explain what the program does or does not do. For example, *Flight Simulator*'s review begins with Dick Fugett explaining how his PC naiveté caused him to crash endlessly. Come back when you're PC literate, Dick. Reviewing the same product, Steven Levy says he found it took too long to learn, but that it's "obviously a super value, as its huge popularity indicates." Goldfish swallowing had its heyday, too, Steven.

WESC is also something of a graphics carnival. There are almost as many picas, boldfaces, italics, and variations of capitalized and uncapitalized words as in my first *Macpains* attempts.

If you're already familiar with the market, you'll appreciate the book's in-

PC

Whole Earth Software Catalog
Stewart Brand, Editor in Chief
Quantum Press/Doubleday
501 Franklin Ave.
Garden City, NY 11530
(516) 294-4400
Copyright: 1984
Cover Price: \$17.50
ISBN: 0-385-19166-9

CIRCLE 744 ON READER SERVICE CARD

BOOK REVIEW

sights. Through anecdote and opinion, *WESC* intelligently identifies the best of what's available. And it's remarkably current—the book took an unheard-of 6 weeks to get from manuscript to print.

The *WESC* reviews are empathic—they strike a common chord in the computer conundrum. Who else but Brand would title a database section "Organizing" and have it contain subheadings like "Little Boxes," "Other File Boxes," and "Garbage Bags" to help us organize data? *WESC* is a master work of the textual icon—powerful phrases that remain with us, reminding us that reviewers who love their work and their industry are always worth the read. Brand's book probably won't help you figure out which word processor will hold the biggest document, but it will help you ask the right questions.



OMNI's Complete Catalog of Computer Software

Edited by Owen Davies
Macmillan Publishing Company
866 Third Ave.
New York, NY 10022
(212) 702-2000
Copyright: 1984
Cover Price: \$13.95
ISBN: 0-02-008310-6

CIRCLE 743 ON READER SERVICE CARD

OMNI's Complete Catalog of Computer Software is an ambitious attempt to create a functional printbound reference for a very dynamic industry. It is everything I'd expect from a traditional reference book: consistent, comprehensive, and well indexed. Perusing it will give

you a strong idea of what's available, and consulting it before a purchase can help you pick the package that best meets your needs.

The book is editor-in-chief Owen Davies's second big computer catalog. The first, *OMNI's On-Line Database Directory*, was manna from heaven for telecommunications users. While the *Complete Software Catalog* is not as complete as the *Database Directory*, it is certainly one of the best collections of what's available that I have seen.

Davies parceled out the software reviews to 70 well-known computer writers—luminaries like Seymour Papert (MIT's prestigious creator of the Logo language), Carl Helmers (*BYTE*'s founding editor), Jerry Pournelle (*BYTE*'s sci-fi columnist), and "Peter Runciman" (the pen name of a New York City-based

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CIRCLE 182 ON READER SERVICE CARD

BOOK REVIEW

computer magazine editor; I'll gladly give a free copy of the book to anyone who divulges it). These and other writers offer introductory comments on their areas of expertise.

The reviews are brief enough to be palatable and lengthy enough to transmit a sense of the program's character. The text is plain vanilla, no illustrations or embellishments, and the language of the book assumes a more technically experienced readership than the WESC. However, unlike WESC, the reviews have no author bylines.

Over 950 packages are reviewed. Each review offers a concise overview of the program, perceptive comments and criticisms, manufacturer's specifications, and hardware requirements. The reviews are remarkably even in content and style. It's obvious that the book was carefully compiled and edited.

The disadvantages of having a printed "computer catalog" are more pronounced in OMNI's book than in WESC. The Whole Earth folks made updating one of their priorities (to be included in their quarterly publication, the *Whole Earth Review*). The OMNI's *Catalog* is already pretty much outdated, though both books were released nearly simultaneously.

The OMNI *Catalog* includes a helpful compatibility index and glossary, although many machine compatibilities are omitted. However, claiming to be a complete catalog is also a risky business. I wish OMNI had maintained that its catalog was just a beginning rather than the final word.

The OMNI Catalog has a generous representation of occupational software: medical, legal, accounting, but an absurdly large section on agware (agricultural software). Twenty packages about farm and crop management is great, but let's give equal time to dry-cleaners, screenwriters, the construction business, weavers, and other software-desiring members of the work force.

OMNI's Complete Catalog of Com-

puter Software is a good, solid reference book. While catalogs can't hope to keep up with the market's latest, the reader will find most current products discussed

in this book. And, as an easy-to-find indicator of what's available, thumbing through the pages of a catalog has advantages over other types of reviews. ■

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COMING UP



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IBM Enhanced Color Graphics Adapter

IBM's EGA supports more displays, more modes, more memory, and more colors than either of the original PC display adapters; it is better integrated, more flexible, and more expandable. *PC Tech Journal* will have a complete technical review of this new product.

Encryption and the PC

Techniques for controlling access to information through disguises have been used throughout history. In the first of a two-part article on encryption, *PC Tech Journal* introduces some modern encryption methods and how they can be used in microcomputer data security.

Two New Printers from IBM

The Quietwriter and the Wheelprinter from IBM are by-products of the company's broadest application of new technology to the office typewriter marketplace since the introduction of Selectric typewriters. *PC Tech Journal* reviews and evaluates these two printers.

Turbo-Charged Debugging

Two hardware-assisted debuggers, PC Probe and PCT-PC, combine software with a board that fits into an expansion slot and a probe into which the PC's 8088 microprocessor is plugged. Both provide debugging power formerly available only with more expensive in-circuit emulators. *Tech Journal* tests both and makes recommendations for applications.



Coming Up



LumenS and Lumen-Micro

If you've ever tried to work at a computer screen obscured by glare, you know that poor lighting can cause eyestrain and fatigue. Proper lighting design, however, can help improve worker efficiency in a variety of ways. *LumenS* and *Lumen-Micro* from Lighting Technologies help designers create better lighting systems by taking care of the methodical and tedious calculations necessary to model the effects of lighting changes. Based on the highly-respected mainframe programs LUMEN II and LUMEN III, these new packages for the PC can help architects and engineers save on energy costs while gaining better control over the ambience of rooms they design. *PC Magazine* reviews these two systems.

Expert Systems

Expert systems are programs that attempt to imitate certain aspects of human thinking. They digest principles fed to them by human specialists and apply those principles to new situations to reach "intelligent" solutions to problems. Expert systems for micros are still in their infancy, but they are a direct outgrowth of nearly 30 years of mainframe-based study in artificial intelligence (AI).

PC Magazine will explore the concepts behind expert systems and examine some of the systems currently available for the IBM PC. The eight programs reviewed range from decision-support systems with some expert-system attributes to inexpensive but fully functional expert systems designed primarily to give users a taste of the technology to full-fledged, highly sophisticated, and costly systems best suited to the needs of large companies with extensive resources. In addition, *PC* will look at several implementations of LISP and PROLOG, two programming languages widely used in artificial-intelligence research.

One-Write Plus

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